SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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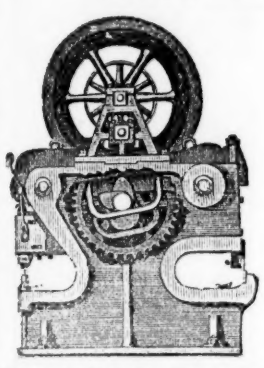

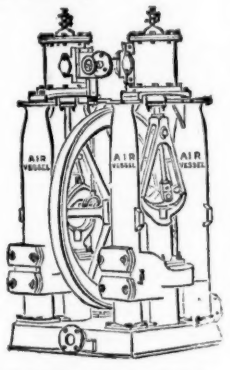

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PARIS, BRONZE MEDAL, 1867.

ORDER OF THE CROWN OF PRUSSIA.

FALMOUTH, SILVER MEDAL, 1867

A DIPLOMA—HIGHEST OF ALL AWARDS—given by the Geographical Congress, Paris, 1875—M. Favre, Contractor, having exhibited the McKean Drill alone as the MODEL BORING MACHINE for the ST. GOTHARD TUNNEL.

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At the south end of the St. Gothard Tunnel, where

THE McKEAN ROCK DRILLS

Are exclusively used, the advance made during eight consecutive weeks, ending February 7, was 24·90, 27·60, 24·80, 26·10, 28·30, 27·10, 28·40, 28·70 metres. Total advance of south heading during January was **121·30 metres, or 133 yards.**

In a series of comparative trials made at the St. Gothard Tunnel, the McKean Rock Drill continued to work until the pressure was reduced to one-half atmosphere (7½ lbs.), showing almost the entire motive force to be available for the blow against the rock—a result of itself indicating many advantages.

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N.B.—Correspondents should state particulars as to character of work in hand in writing us for information, on receipt of which a special definite answer, with reference to our full illustrated catalogue, will be sent.

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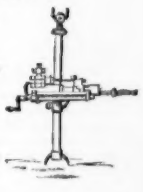

Dunn's Patent Rock Drill Company

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"5. Its having an automatic feed, giving it a steady motion, &c.

"6. Its greater steadiness and absence of jar and vibration experienced in other drills, which is very destructive to their working parts, &c.

"7. Its greater power is some FORTY PER CENT. in favour of the Ingersoll."

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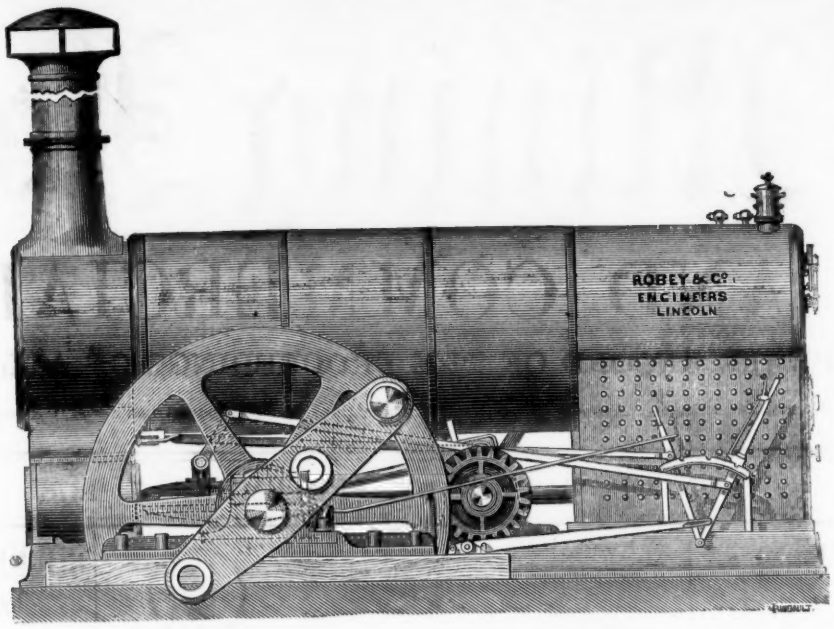

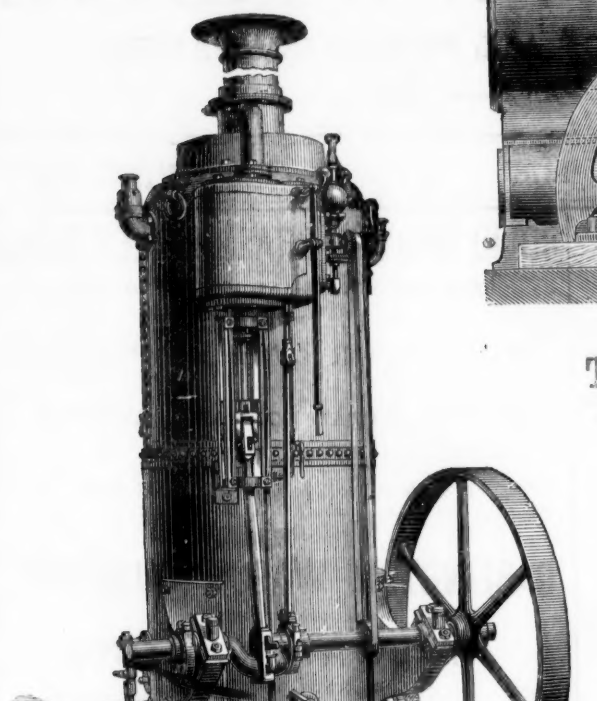

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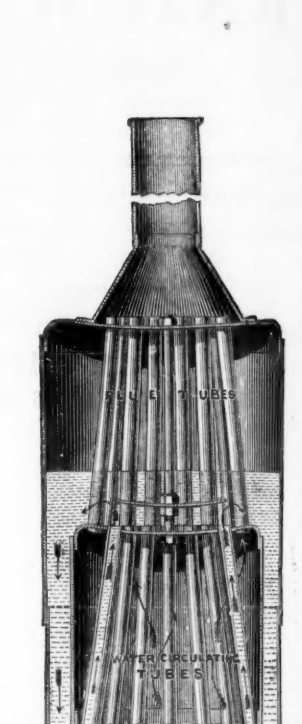

MECHANICAL VENTILATION OF MINES.

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[Estimates and further information will be prepared on receipt of the necessary particulars].

FOR SINKING PURPOSES, and also for places where small quantities of air are needed for Ventilating purposes, a Special Fan is made, in various sizes, with small engine combined, complete, arranged for both forcing and exhausting air.

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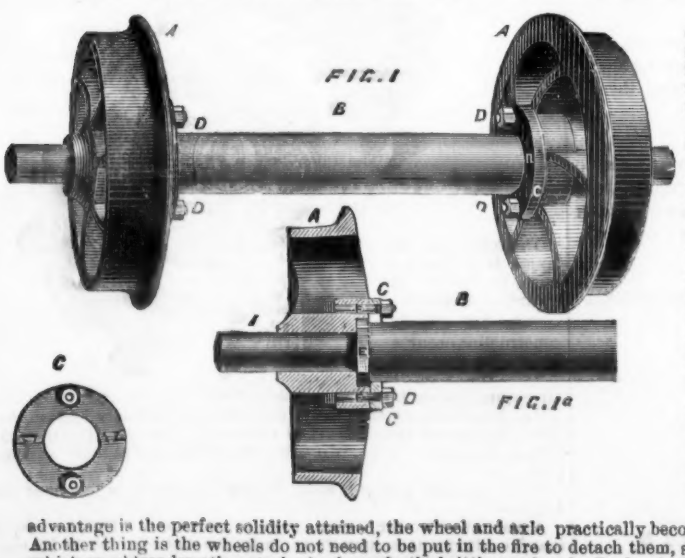
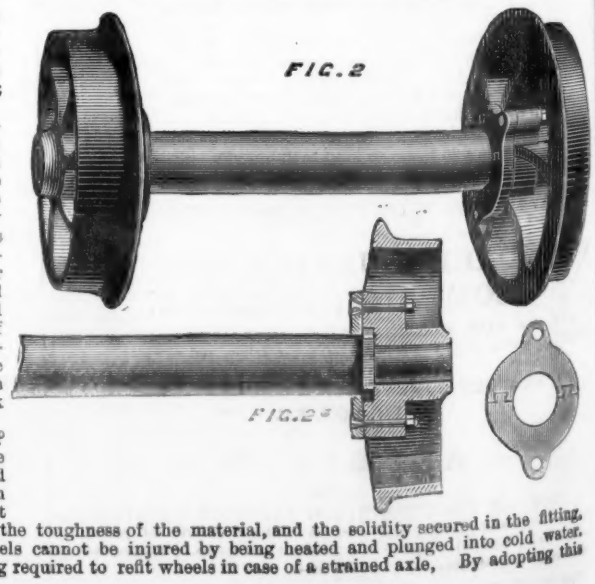
Sykes Works, Eyre-st. & Bridge-st., Sheffield. London Office: 118, Cannon-st., E.C.

A New Patent Method of Fitting up Wheels and Axles.



Figs. 1 and 1a show a longitudinal view and plan of a pair of corf wheels and axles fitted up for outside bearings, and Figs. 2 and 2a for inside bearings. A A, are the wheels; B, is the axle; C C, the washers; D D, the bolts; E, the collar on axle B; and F, the recessed boss in the wheel.

The wheel is cast with a recessed boss in the inside, made to any shape, corresponding in shape and depth with a collar formed on the axle, which is forged of solid steel; the axle is secured into the recess partly by being sufficiently tightly fitted to require driving home with a hammer, and partly by the washer. Around the axle adjoining the boss is fixed the washer, made in two parts and dovetailed, so as to allow of being fixed after the collar has been forged on the axle. The washer is secured to the boss by bolts and nuts, both in outside and inside bearings; in the case of inside, by means of lugs cast on the boss, and the washer made of corresponding shape; the washer is made of crucible cast steel. The only tool required for fitting is an ordinary spanner for outside bearings, and a box spanner for inside bearings.



Now what are the advantages of this method? You secure a simple way of fitting—it can be done by anyone who has seen it—the only tool required being a spanner; the wheels can be detached from or secured to the axle in a few minutes. The next advantage is the perfect solidity attained, the wheel and axle practically becoming as one piece. The durability results from the toughness of the material, and the solidity secured in the fitting. Another thing is the wheels do not need to be put in the fire to detach them, as is the case in ordinary wheels. (N.B.—Our wheels cannot be injured by being heated and plunged into cold water. which wouldrender other steel wheels perfectly brittle as glass.) Saving in fuel and wages is evident—no skilled labour being required to refit wheels in case of a strained axle, By adopting this system colliery owners may save hundreds of pounds sterling yearly.

Original Correspondence.

BORING MACHINERY.

SIR,—Lest the adventurers in mines should be deterred from adopting the most recent improvements in opening mines allow me to lay before your readers and those interested the actual costs of the necessary plant at Wheal Agar—better and more powerful than which does not exist in the county. The drawings for the air compressor were kindly supplied by Mr. Darlington, of Coleman-street Buildings, Moorgate-street, London, than whom few have had more experience. It will be observed the length of stroke is double that of most compressors used in the county, and in many places out of it. The reason for this is, experience and practice have proved that a slower stroke and a long one is more efficient than the short and quick.

The following is the cost:—20-in. horizontal engine, 5-ft. stroke, with 5 ton fly-wheel and boiler, 225*l.*; 18-in. air compressor, 5-ft. stroke, 75*l.*; two air reservoirs (old boiler tubes), 3 tons each, with fixing, 50*l.*; 250 fathoms of 2½ in. wrought-iron pipes, for conveying the air 220 fms. deep, at 3s. 3d. per foot, less 75 per cent. discount, about 60*l.*; two of Darlington's boring machines, 45*l.* each, 90*l.*: a total of 500*l.*

How and why a plant should cost 1300*l.* or 1400*l.* for half the power is past my understanding. Any persons interested and wishful to see the machinery can by applying to the agents at the mine see it and judge for themselves. With a steam pressure of 40 lbs. to the inch we have raised the pressure in the air reservoirs to 62 lbs. per inch, until the steam piston failed to complete its stroke.

Of rock drills your columns show the diverse stories of each patentee. Some claim they have discovered a wonderful means of utilising all the air which can enter the drill—nay, they almost claim they can get more out than goes in, yet the result does not exceed the duty done quietly and unpublished at various places. Men are learning that this and that machine will bore, and that less depends on the machine than the men and system.

Beaumont's machines were made larger that they might work at at a lower pressure, at 45 lbs. instead of 60 lbs. The Barrow was enlarged that the blow might be increased, and the duty done by each has been more satisfactory. The various kinds of drills made by Mr. Darlington have equalled in effect the speed of boring, and wherever system has been observed equal or greater progress at greatly reduced cost than manual labour has been done, while in sinking 2½ fathoms a week has been accomplished under an arrangement specially Mr. Darlington's design. Misrepresentations seem the rule of the day; machines untried in practical working are pronounced the best, yet are comparatively worthless underground from the multitude of parts.—*Sept.* 5. H. WADDINGTON.

ROCK-DRILLING MACHINERY.

SIR,—Allow me to reply to some of your correspondents observations on my letter of Aug. 21. With regard to Mr. Dunn's letter, allow me to point out that his version of the trial at Levant du Flenu is only inaccurate in so far as it is incomplete. I did not profess to give the full result of this competition boring for the very good reason that the official report is not yet published; but what I did state had reference merely to the amount of work different machines would do with a limited quantity of air compressed to a certain pressure. I again repeat, and to use Mr. Dunn's own words, "this statement may be verified by referring to the Commissioner's books, or to Mr. Mativa, engineer to the Société Levant du Flenu, and others who were present when this trial took place" (among whom I may mention Mr. Villiot, engineer to Société de la Meuse, in Liége); that when the machines were tried in the way I have described in my letter of Aug. 28, the Dubois et François and the Dunn machines bored 1·20 and 1·30 metres respectively, and my machine bored 4 metres, and it was still running when M. Cornet, the director of the mines, shut off the cock and invited us to dinner, expressing his surprise at the result.

In order that the engineering public and those interested in rock drills may correctly judge of the result of the boring which Mr. Dunn refers to in his letter of Aug. 21, it must be understood that this result was obtained when boring with a constant pressure of 3½ atmospheres (the pressure used for all the machines), and it must be borne in mind that the cylinder of the Dunn machine was 100 millimetres, whilst mine was only 73 mm. When I found this great difference in size of the machines I ordered a No. II. machine, cylinder 82 mm., to be sent down, and then with a pressure of 3½ atmospheres Mr. Dunn's machine and mine proved to be by far the most effective, both averaging about 18 centim. per minute. This No. II. machine also bored 13 to 14 centim. per minute when I started with only 2½ atmospheres, which I did to prove that my machine could bore effectively with much less pressure than any of the other machines competing. Had I bored with one of my machines having a cylinder of 100 mm. the result would, of course, have been considerably greater. There is considerable mystery about the non-publication of the official reports of this competition, concerning which observations have been made in La Semaine Industrielle, of March 14, 1878.

With regard to Mr. F. J. King's observations on my taste in bringing my inventions before the public, I cannot allow him to assume the functions of an instructor on this point. As I give reasons for my depreciation of many drills which are advertised to be "the very best, cheapest, most durable, effective, &c., in the world," it is open to anyone to accept or reject the deductions I make. Again, I may observe that I *have* proved my claimed improvements to be really such, and until I had done this I was content for my drill to remain comparatively unknown.

Anyone reading the *whole* of this correspondence will at once see where the good taste is wanting. Mr. King conveniently ignores the data which I gave in my letter of Aug. 21, showing that while the Darlington Drill bored 0·5 in., my machine averaged 1·48 in. per minute under the *same* conditions. But apparently ignorant that different rocks vary very much in hardness, he asserts that my machine should bore 450 inches a minute in granite, because the Darlington on a certain occasion averaged 5½ in. Now, to argue this question with a gentleman who confounds "100 per cent. less" with 100 times less would take up too much of the valuable space of the Journal, so I will merely remark in disposing of Mr. King's letter that in 1871, at Freeman's Wharf, the Burleigh drill bored more than 7·67 in. per minute in granite, and that the same machine could only bore from 2 to 2½ in. in Swedish granite, showing how infinitely rock varies in hardness. In addition, too, to the actual penetration per minute even in the same rock, the consumption of motive fluid and the pressure must be taken into consideration.

Messrs. Le Gros, Mayne, Leaver, and Co., wrote that much reliance cannot be placed on the facts I have stated in my letter of Aug. 28, because they assert that the Ingersoll machine was not working at the Magpie level. I beg to make public the grounds on which I made the statement which has given such offence to Messrs. Le Gros and Co. First, the information repeatedly given to me verbally by Mr. A. Brocklehurst, manager of the Magpie Mines and by many of the miners—i.e., that the Ingersoll drill had been tried in the said level, and had not given satisfacton, and that the air-compressor could not drive it effectively. Secondly, the evidence of my own observation at a quarry near Bakewell, where an air-compressor of exactly the same size as the one at the Magpie level had to run 120 revolutions in order to supply air for one small Ingersoll's drill. The compressor at the Magpie, running from 65 to 70 revolutions, kept up air for two of my large machines. This second fact is only relevant to the question at issue in so far as it appeared to me to corroberate the statement of Mr. Brocklehurst and the Magpie miners.

I do not wish to combat Messrs. Le Gros and Co.'s statement that an "Ingersoll was at the Magpie Mine for some time, but not working"—such may be the case; but I also know that an Ingersoll drill was there and was worked, and that it required a higher pressure for its satisfactory working than the air-compressor could keep up.

With reference to the boring competition at Levant du Flenu, Mr. Dunn, Mr. Mativa, Mr. Villiott, and I, among others, were present, when one Ingersoll drill was unpacked, and taken into the shed where the other drills were exhibited; still Messrs. Le Gros and Co. say they were unrepresented. It is in consequence of "Delta's" letter that I was compelled to make public the facts which have proved so unpalatable to the parties concerned. I must apologise for trespassing so much on your valuable space, but when unjustifiable attacks are publicly made they must be as publicly repelled.—*London, Sept.* 2. RICHARD SCHRAM.

Since writing the above I have received a telegram and a long letter from Mr. A. Brocklehurst, manager of the Magpie Mines. The telegram, dated Sept. 4, runs as follows:—"I worked Ingersoll's drill 20 days in level, and I could not work under 65 lbs. pressure." In the letter of the same date, referring to the working of the Ingersoll drill in the Magpie level, he says:—"Being so far from the air compressor we could not work to cut any ground with less than 65 lbs. pressure, and that pressure we had plenty of work to keep up. We saw at once that we could not work more than one drill." * * * "Until Mr. Schram brought out his machine we had no success at all by machinery, and now our level is three times as hard as it was when Ingersoll's drill was at work, and with Schram's machines we can put in two machines, and make everything ready, and bore with the two machines 55 ft. of 1½ in. holes in five hours at 35 lbs. pressure, and never more than 40 lbs. pressure, and the air has to travel 1200 yards from the compressor, through 1½ in. piping. There is no machine going will work at the same pressure as Schram's machine will."—A. BROCKLEHURST.

ROCK-DRILLS—THE HALKYN MINES DRAINAGE.

SIR,—In reading the report of the proceedings of the Miners' Association in Cornwall and Devon, in your issue of the 31st ultimo, I was struck with the apparent unfairness with which Mr. Taylor's reference to the operations of the Halkyn District Mine Drainage Company was reported. The drill employed in carrying out this vast undertaking is the "Percussive Drill" of the Diamond Rock-Boring Company, patented by Col. Beaumont, and which in the last month has driven from one heading 68 yards in Flintshire limestone; but, to any of your ordinary readers, it would be supposed from the report I refer to that the Jordan rock-drill was the machine used, inasmuch as that is the only one mentioned in the paragraph, and that the Diamond Rock-Boring Percussive Drill is not noticed or mentioned in the report. In all fairness I ask you to insert this letter. D. J. KENNELLY,

Diamond Rock Boring Company.

Devonshire Club, St. James's, S.W., Sept. 1.

NEW AIR COMPRESSOR.

SIR,—As a somewhat lively discussion has for some time past been going on in the *Mining Journal* with regard to the various merits and construction, perhaps you will find space for a brief description of a new air compressor in which a friend of mine is interested. Your readers will understand the importance of the matter when I state that his object is to simplify and render more durable certain parts of the machine which are especially liable to wear and tear, and that it has very frequently been pointed out that the great obstacle to the universal adoption of rock drills is the great cost of providing and maintaining the air compressing machinery. The first cost of the new compressor to which I allude would not, I think, be greater than that of other air compressors in the market, and the cost of maintenance would be decidedly less.

In engines of the kind to which the present improvements are applicable one or more steam cylinders and pistons, or other suitable motive-power details, are through a rotating crank shaft made to work the piston or pistons of one or more compressing cylinders, the valves of which are arranged to draw in air or the gas to be compressed, and to compress it and deliver it into a receiver. One of the improvements relates to the valves of the compressing cylinder or cylinders, and consists in employing a peculiar modification of slide-valve worked from an eccentric or crank on the rotating shaft. There may be a single valve slide for the two ports of each cylinder, but it is preferred to have a separate slide to each port, the two sides being worked by one rod. Each valve slide is made with a cavity for putting the cylinder port in communication with an inlet port when moved towards one end; the slide does not uncover the cylinder port when moved towards the other end. The valve slide is made with a port through it for the passage of the compressed air, and this port in the slide is fitted with a lifting or clack valve, which may be of leather or rubber, or any other suitable material, by preference strengthened with metal plates. The lift valve in the valve slide prevents the compressed air or gas in the casing from expanding in the cylinder at the beginning of each compressing stroke, and the air or gas is compressed in the cylinder until its pressure equals that in the casing, and it then lifts the valve in the slide, and passes into the casing and thence into the receiver.

But this is not the only improvement which Mr. Alexander (for I should state that Mr. John Alexander, of the Gartsherrie Ironworks, is the inventor) has introduced. Another part of his invention relates to certain self-acting apparatus for preventing the expenditure of power when the air or gas in the receiver has at any time reached what is considered a proper maximum pressure. This apparatus comprises a loaded piston arranged to be acted on by the pressure in the receiver, and connected to equilibrium or other suitable valves in passages communicating with the ends of the compressing cylinder or with the valve casing or casings and the inlet or atmosphere. On the maximum pressure being attained in the receiver, the loaded piston opens the valves to which it is connected, and the compressing piston or pistons can then merely make the air or gas circulate through the passages. As a result of this the speed of the steam or other motive-power engine will tend to increase, but a speed governor with which the engine is fitted, and which may be of any suitable known kind, will immediately act on the throttle or other regulating valve, and check the speed. Or, instead of employing a separate speed governor, the throttle or regulating valve of the motive-power engine may be connected to the loaded piston before referred to, so as to be acted on by it.

Edinburgh, Sept. 2. ——— AMICA.

MINING IN NEW SOUTH WALES.

SIR,—There has been more than one proof lately that our gold mines only want moderate capital and perseverance to pay, as in several instances where abandoned claims have at last had the leases forfeited by the Mining Department, and the working miner been able to try them, excellent results have been got, and in some cases very rich ores—notably, at Hanging Rock, Solferino, and Adelong, places hundreds of miles apart, showing how wide spread the field is, and that its richness is not confined to one locality, whilst large crushings of hundreds of tons, averaging from 1 to 2 ozs., are not uncommon.

Out of the hundreds of mines (?) opened—or rather, "scratched at"—not more than a dozen, if so many, have ever had a fair trial or a moderate capital sunk in developing them, but where such is the case very encouraging results are now beginning to show that the gold is there, and only wants proper working to make it pay.

Sluicing is now coming to the front a little also; and at Araluen Newman is "showing them all the way" by his new system of underground draining for wet claims, and with an outlay from first to last of about 7000*l.* (5000*l.* of which came out of rewashing old stuff as he went along) he has built a timber box drain of more than a mile long, which is now at last on the bed rock, and so saves all pumping, and enables him to work his claim to a "face" of 90 or 100 ft., and all gold over 3 grs. to the load is profit. His success (as he is now clearing over 50*l.* weekly, and when he gets fairly out of the old worked ground into the "solid," will probably clear 150*l.*) will revolutionise the valley, as there is room for labour in it to an enormous extent, on the same principle, whilst there are very large areas which will also pay splendidly for hydraulic work like the Californian system, and only waiting the magic touch of skill and capital to become first-class investments.

Hitherto we have but very few discoveries of silver ore, and I now send you a condensed copy of "Mr. Warden" Graham's report, dated June 17, to the Minister for Mines, on a discovery near Tenterfield, in our New England district:—

THE SILVER MINES NEAR TENTERFIELD.

Mr. Warden Graham has made a very important report to the Under-Secretary for Mines on the new silver discoveries at Boorook, near Tenterfield. Mr. Graham sent a quantity of picked specimens of stone, raised from the Addison reef, to the Mining Department in Sydney for analysis. The specimens were obtained from the 24 ft. level. These have been analysed, with the following result:—Silver, 527 ozs. 2 dwts per ton; gold, 18 ozs. 2 dwts. 10 grs. per ton. As the discoveries are of much importance we here give a few particulars of the Boorook silver mines, culled from Mr. Graham's report:—The Boorook gold-field was discovered about seven or eight years ago, and a reef was opened, called the "Nil Desperandum" reef, a ton of picked stone from which was sent to the Mint, and yielded 105 ozs. —60 ozs. of gold and 45 ozs. of silver; another ton from 40 ft. level (picked) yielded 150 ozs., with about the same proportions of gold and silver. Machinery was put on the ground, the surface stone was payable, but as the reef was sunk it got poorer, and was eventually abandoned. Tin being discovered in the district about this time, the whole field was abandoned, without testing the stone which had been raised from many of the reefs. This appears to have induced Mr. Horton to place the present machine on the ground, in order to get trial crushings from the raised stone. The most satisfactory of the crushings as yet have been from the Addison and Golden Age reefs. The Addison Reef is situate about two miles in a northerly direction from the machine; it intersects a steep hill at nearly right angles. The first or lowest opening on the reef is about 150 ft. from the base of the hill, which rises at an angle of about 30 or 35°. The reef here is at least 6 ft. wide. An open trench has been made in it for about 10 or 12 ft. It shows well-defined walls. About 100 ft. further up the hill a shaft is sunk, which is now 25 ft. deep. The reef here is still 6 ft. wide, showing well-defined walls, with a slight westerly dip. These openings are both in two acres applied for by Messrs. Horton, Tunnell, and Donovan. From the shaft referred to, which was originally (some seven years ago) sunk to the depth of 22 ft. and abandoned, some 40 tons of quartz have been crushed by the present proprietors. This stone had been lying on the surface of the old shaft, and it yielded 138 ozs. of gold and silver mixed, which averaged a value of nearly 9s. an oz. There was a great proportion of rubbish out of the old shaft and surface soil in the 40 tons, and the yield, although good, can scarcely be taken as a fair average. A subsequent crushing of 4 tons, also composed of quartz, rubble, and surface soil, from the same shaft, yielded 15 ozs. The Royal Mint return of the 138 ozs. gave 8½ ozs. standard gold and 110 ozs. silver. The returns for the 15 ozs. have not yet been received.

I need hardly say that his report may be relied on, nor now also hardly add, that with our supineness in all mining affairs no one will care to pause about it; the proprietor will probably lose his time and all his little means in trying to prove whether he has a Comstock lode or not, will find his capital insufficient to achieve final success or probably even any real approach to it, and leave it in disgust for the next generation to reap the profit, if there be any profit in it.

Sydney, June. R. D. ADAMS.

NOTE.—This report is the result of the new system introduced here by Mr. Harrie Wood (Under Secretary for Mines), as before his time no official report of any discovery was ever sent in to head-quarters in Sydney. It is a step in the right direction, as, with a vast territory like ours, isolated discoveries by poor men would remain unknown, and be disbelieved in if reported by interested parties only. Another important innovation, also, on the old plan of "how not to do it" was introduced by him, and has been heartily carried out by the Hon. Mr. Lucas and the Hon. W. H. Sutton (as Minister for Mines) in allowing the Government Geologist, Mr. S. C. Wilkinson, F.R.G.S., to inspect and report on private mineral properties, the reports being lodged in the office, and certified copies issued to the owners. The importance of this can hardly be overrated, as, in the event of any property being placed in the market, the intending shareholders have a *bona fide* idea of what they are going into, and it completely cuts away the ground from under the feet of all "bogus schemes and schemers" in the future. R. D. ADAMS.

RICHMOND MINING COMPANY.

SIR,—Shareholders may like to know what are the actual powers possessed by the President of a company incorporated under the laws of the States of Nevada and California. I find that the bye laws in general use provide as follows:—The President of the board of trustees shall have the power—1. To call meetings of the shareholders whenever he deems it necessary by giving 14 days' notice, and also upon a written request of persons representing one-third of the capital stock of the company.—2. To appoint and remove at his pleasure all employees and agents of the company; to prescribe their duties and fix their salaries.—3. To make rules and regulations not inconsistent with the laws of the State or the bye laws of the company for the guidance of the officers and management of the affairs of the company.—4. To declare dividends out of the surplus profits whenever he shall deem expedient.—5. To incur such indebtedness as he may deem necessary (in some companies this is limited to $100,000), and to authorise the execution by himself and secretary of any note obligation, mortgage, or other security for such indebtedness.—6. To appoint a superintendent or general manager to manage the property subject to his general direction and control.—7. To authorise and sign all contracts and agreements.—8. To compromise any action at law, and to convey any of the real estate and property of the company with, but not otherwise, the consent of the holders of two-thirds of the share capital of the company.

The bye laws may be altered or amended at any special meeting called for that purpose by a vote of two-thirds of the share capital of the company. Shareholders will thus be better able to appreciate the force of Mr. Wren's (the President) evidence—"The property is vested in me under the bye laws. The English company exercise no control over the property." And also Mr. Probert's position as general manager of the Nevada Company when he states—"I pay particular attention to the property, works, and ground at Eureka as a subordinate. Every act of mine must be submitted by me to the President."

The bye laws provide for the annual election only of trustees, and shareholders have not the power, as they have here, of turning out the trustees by calling a meeting and voting a want of confidence. In the case of the Richmond Company of Nevada, the election of trustees for the year is held on the first Monday in August of each year. The trustees serve for one year, and until their successors are elected and qualified. Last year, for some reason or other, the company did not hold the annual meeting required by the bye laws for the election of trustees, so that the old trustees remained over. I daresay the board in London remained in ignorance of this act of omission. This year the meeting was held on 5th ult., and Messrs. Wren, Probert, and Price are in power as trustees until August, 1879, should the Nevada Company continue in existence.

Sept. 4. ——— R. M. BRERETON.

RICHMOND CONSOLIDATED MINING COMPANY.

SIR,—We may draw our own conclusions with regard to the correspondence of Messrs. Brereton and M'Ewen. The former sold his shares, and "bears" them; the latter has not sold his shares, and "bulls" them. It is as dishonest to represent these shares as being worth from 20*l.* to 30*l.* per share for selling purposes as it is to depreciate them for selfish motives. When Mr. M'Ewen has sold his shares, and his interests have become identical with Mr. Brereton's, they will probably be found in the same boat. In the meantime, let the public beware, and avoid Richmonds. It is a market mine. What confidence can be placed in a managing director who, contrary to the advice of counsel's opinion, takes a contract from his co-directors; and what confidence can be placed in a board which grant a contract to a co-director, and who also grant five guineas for travelling expenses to their vice-chairman every time he attends a board. Knowing these occurrences to have taken place, one naturally wonders what other illegalities they have been guilty of. What confidence can be placed in our trustees, who in a court of law swore that the mine does not belong to the Richmond Consolidated Mine Company, and that it would be no breach of trust on their part to retain possession of it? Shareholders have the pleasing alternative of believing the evidence of their so-called trustees, in which case they do not own a mine; or, if they elect to disbelieve it on the grounds that the mine is theirs, the reflection that their trustees have sworn falsely would not be conducive to their confidence in their trustees. Granting, for the sake of argument, that the mine is a good property, how can it be worked to the advantage of shareholders when in the hands of persons shown to be unworthy of confidence? Mr. Bayliss has proved himself to be a straightforward man, and has endeavoured to introduce good and business-like management, but all to no purpose, and he is obliged to relinquish it as hopeless, and retires in disgust. With such facts before us everyone is capable of forming his own opinion of the

value of a Richmond share, and the advocacy of the ex-chairman, Mr. Elliott, who retired from the board under pressure, is valueless.
Sept. 5. ——— SHAREHOLDER.

RICHMOND MINING COMPANY.

SIR,—Mr. Brereton has kindly sent to the Richmond shareholders a pamphlet of ten pages to prove that the value of their property is 2*l.* 11s. per share. I am not going to enter into controversy with a man who appears to be as ignorant of mining finance as he has shown himself unworthy of the trust reposed in him by the Richmond shareholders. I may, however, state that three years' purchase of the average of seven years' back profits is not the standard of value for mining property either in America or anywhere else, and if the Richmond shareholders, whose property Mr. Brereton attacks, wish to see how far they can attach credence to anything he may say with regard to the mine or its value, I need only point out to them that the amount of undivided profit now in hand in bullion and in cash is not far short of 2*l.* 11s. per share, or the valuation Mr. Brereton puts upon the entire property. Comment is needless. If the Richmond shareholders will judge Mr. Brereton's other allegations and statements by the accuracy of the estimate of value he has put forward, they will not be far wrong.
Westminster, Sept. 6. ——— LAWRENCE T. MCEWEN.

MINING IN NORTH CAROLINA.

SIR,—I would direct the attention of the readers of the *Mining Journal* to the Copper Knob Mine, formerly known as Gap Creek Mine, which is a true fissure vein, or rather a number of veins, but one of which is explored and has a perfect regularity in its course as well as the walls; it strikes boldly into the mountain, and carries gold, $77·51; silver, $45·65; and copper 40 per cent. to the ton, as per assays made by Prof. Hanna, of the U.S. Assay Office, Charlotte, N.C., and Prof. Eckfeldt, of the Philadelphia Mint. The shaft is sunk 63 ft., the vein increasing in width. Ore Knob Mine, 17 miles distant, is worked by Messrs. Clayton, they now have 500 hands employed in mining, smelting, and reducing copper, and are making about 2 tons per day of ingot copper by the Hunt and Douglass process. Prof. Emmons, late State Geologist, in his report states: "The rock in which it is situated is a hornblende slate, which has the marks of an altered rock, about a quarter of a mile wide, and hence seems to be an intruded mass in the talco-micaceous slates. Its position is west of the Blue Ridge Mountains, in the midst of the primary rocks, and about 2½ miles from the top of the Blue Ridge, the special mineral that prevails is the vitreous ore with the blue carbonate and chrysocalla, or silicate of copper, the indication is that this is the ore that will prevail, which upon an average will be probably twice as rich as the yellow sulphuret." Its strike is south 35°, dip 45° east, angle of dip 45°. Labour is abundant and cheap, about $1 per day; wood plenty, at $1 per cord; water the year round. The roads are good, and there are churches, schools, and stores in the vicinity. This mine, therefore, offers for the investment of capital or formation of company to work it superior inducements. It is considered that a plant not to exceed 500*l.* will be all that is needed at present to develope it, as the matte can be reduced at Ore Knob Works. There are on the property several other veins, but they are not as yet tested. CLARENCE M. BUEL.
Park-row, New York, Aug. 16.

KYNANCE COVE.

SIR,—Many of your readers I dare say are aware that this small village, situate near the Lizard Point, Cornwall, is one of the favourite resorts of excursionists when they come into the county for pleasure. About 10 or 12 years ago a gentleman in London, knowing the celebrity of the place on account of its natural attractions, conceived the idea that the investment of 12,000*l.* or 15,000*l.* in a hotel similar to that at Falmouth would be a good undertaking. In the summer months it would pay, he conceived, by the reception of the thousands who now go there for a day, and who, if there were accommodation, would stay probably several days. In the winter if would probably pay by the entertainment of visitors, who would be glad to lodge by the seaside in a mild temperature, and in a pure atmosphere, such as are there afforded.

Having seriously resolved to execute the idea, the gentleman instructed me to go down and select a spot for the building; which I did. He then requested me to see if I could procure the freehold of about 100 acres of the contiguous land, to be converted into pleasure grounds. I submitted the matter to the agent of the owner of the property, who, after a few days, stated the terms upon which it might be had. So well as I can remember the terms were 100*l.* per acre, and 50*l.* annual rent forever; 25*l.* per acre was enough for the land, without any rent at all. The consequence was the negociation ceased, and the idea of a noble hotel at Kynance Cove was abandoned; but the gentleman paid me for my services. If a fair price had been asked the hotel would probably have been erected.—*Truro, Sept.* 3. ——— R. SYMONS.

THE ENGLISH LEAD TRADE.

SIR,—No great improvement in the general trade of the country having taken place, the aspect presented by the lead market cannot yet be said to suggest any great hope of better prices for produce, there is consequently increased necessity for the exercise of the strictest economy in every branch of mining expenditure, as, should the present low market value for ores continue for any lengthened period, it is absolutely certain that very few undertakings can continue to make profit, and also that many of those which are dependent upon steam power and its attendant expenses for the raising and preparing ore for market will cease to yield a fraction of dividend on their shares if they be not compelled to suspend operations for an indefinite time. Under these circumstances the relative value of investment in enterprises so situated and of those possessing the immense advantage afforded by water power becomes more than ever manifest, and will doubtless greatly influence future share purchases. As probably some further details connected with the mining undertakings of a district already pointed out, the many natural facilities of which are so conducive to a large measure of success, and calculated to make it of more importance still in the future than it has been in the past will prove of interest to your readers, I append a few additional remarks upon Cardiganshire lead mines.

In close proximity to those properties already brought under notice, there are others that participate in the benefits conferred by utilising water as a motive power, and which, consequently, have divided large profits in the course of their progress. There are also others which are undergoing considerable changes in the mode of development, the present management having, it would seem, determined that the resources of the mines in depth shall no longer remain unused, and of these we could point to Red Rock Mine also Caron, Esgair Mwyn, &c., the last named having in its career sold lead ore of the estimated value of three-quarters of a million sterling, and is yet but a shallow mine. The lode in the western part of the mine is, however, now expected to be worked at deeper levels, the recent discoveries showing that another large body of mineral has been met with in sinking the western, or Kneebone's, shaft. Caron Mine is being laid out for proper miner-like development, and the progress made has already been attended with much success in the discovery of richer ore. Of Red Rock Mine a great deal might be said as to the extent and magnitude of the ore deposits, but as these facts will soon be exhibited in the increased sales of ores it is only necessary to remark that the lode or lodes traversing this property are very large, and promise to be enormously productive in depth, it is, therefore, a matter of surprise to many that the capabilities of the mine were not more perseveringly tested at a time when such ample returns of lead ore were made from the upper levels, in which it might with truth be said the workmen were enabled to "quarry" the ore, so capacious and highly mineralised was the lode. A near neighbour, Frongoch, is another marvellous mine, having for a long period returned ore in sufficient quantities to provide dividends for the entire capital of the well known company then working the mine, and yet it is said that if a proper amount of sinking and driving had been carried on the returns would now have been of greater extent than before. It is to be hoped, therefore, that means will soon be devised for the due prosecution of the works required to place this most valuable mine once more in the high position it should occupy as one of the most productive mines in the kingdom.

As it cannot but be interesting to most of your readers, I will endeavour at a future time to adduce further facts connected with Frongoch and its Lisburne associates, which will show that profits have been made and divided at times when the lowest prices for ores ever remembered to have been realised prevailed for many months if not years. Amongst the mines of Cardiganshire there are, besides those before mentioned in my correspondence, many of great value from the ores being rich in silver; these are chiefly in the vicinity of the Darrens, and although they are not at present so fully at work as they were a few years since, their reputation is such that renewed operations may at any time be expected in more than one of them, as the promising appearance of those now at work prove that the lodes at depth are likely to yield large profits. These mines, however, deserve more than a passing observation, and should form the subject of an additional communication.
Bishopsgate-street Within, Sept. 5. JOHN OWEN.

LEAD MINING IN FLINTSHIRE.

SIR,—As we learn by the interesting report published in last weeks Journal that Mr. Richard Taylor, in addressing the Royal Cornwall Polytechnic Society at Falmouth, on Aug. 27, took occasion to point out the promising features of lead mining in Flintshire, and in illustrating the subject gave a most interesting account of the progress now being made with the great Westminster Tunnel by the Halkyn District Mines Drainage Company, with the Duke of Westminster at the head of the board of directors. This level was commenced in 1818, by the then Earl Grosvenor, the object of which was to drain, by means of adit levels, this rich and extensive lead producing district. The length of this tunnel would be in a direct line something like 12 miles, and there were a number of branches. The tunnel would go under the deepest part of the mines, and consequently the drainage of the whole district would be secured. It would appear also that the progress now being made in this great work by the aid of Major Beaumont's boring machine is described as marvellous. This information becomes most opportune for the new venture called the Nannerch Lead Mining Company of Newcastle-on-Tyne, who have secured some most valuable mineral grants in this now favoured district. The celebrated Long Rake or Westminster lode is the north lode in their grant, bearing full east and west; old Pant-y-Go, which yielded to the grandfather of the present Duke of Westminster profits of no less a sum than 180,000*l.*, is within the area of this company's property. The assay of the lead ore brought out of the bottom of the old workings, it appears, is extremely good, being over 82 per cent. for lead, and over 10 ozs. of silver per ton of lead. ——— PLUMBO.

PANT-Y-MWYN MINE (MOLD).

SIR,—I have just seen a copy of the agent's report that was issued to the shareholders with the last balance-sheet, in which he says—"In September, 1877, I drove a cross-cut in the 20 yard level east, about 19 yards from Griffiths's shaft; it was driven 6 yards to the north of the present lode, at which point a fine new lode was discovered running east and west." I beg to ask him, through your valuable Journal, where is this "fine new lode" in the day level only 10 fathoms higher up the shaft? Again, "a 39 yard level has been driven below that of 20 yards." What was the reason he drove a level only 5 fms. below the 10 fm. level; were the engine and pumps found to be too small to sink deeper, or what? I see by a report dated Aug. 9, 1873, that the said Griffiths's shaft was then "5 yards below the day level." The present annual report says—"This shaft has been sunk 30 yards deeper than the day or adit level."

Query: Has it taken over five years to sink 12½ fathoms of the shaft? "The Modlyn shaft is now being sunk, by four men, below the adit or day level 100 yards from the surface. At 12 yards below this the lode will be cut. We intend to sink this shaft 100 yards below the adit level, and then drive on the lode with a pumping-engine on this shaft, and open the adit level so as to take the water." Why is this shaft being sunk by only "four men?" According to the present depth below the level "100 yards" from level to level seems a very long distance. How many 100 yards of the day level wants clearing, and how many years will it take to do it? How is the water now got rid of, seeing the day level wants clearing?—*London, Sept.* 5. ——— OBSERVER.

CARDIGANSHIRE MINES—CWM BRWYNO.

SIR,—This mine, which some time ago was purchased by a private gentleman, and has been since worked by him very successfully, is now being brought out to be worked by an influential company under the Limited Liability Act, particulars of which I am given to understand will soon appear in the *Mining Journal*. Its situation is not surpassed by any mine in Cardiganshire, being in the midst of the greatest and richest mines ever wrought in the county. It is only 48 fms. deep under the adit level, and at the bottom of the 36 fm. level there is now, without exception, the richest bunch of ore being wrought within many a mile of it. The 48 fm. level, by being driven 12 fms. west, will reach this rich ore, and it should continue for 120 fms. long in the same direction, according to the ore ground seen in the upper sections of the mine. There are many other rich courses of ore discovered in this property, as well as great bodies of lead left by the last workers by the sides, all of which can be made available in a few months. All that is wanted is a vigorous prosecution of the underground workings, and a remodelling of the present dressing apparatus, to bring it into a state of profits which would pay at least 25 per cent. on the capital being raised, and as a permanent and an improving property it cannot well be surpassed by any other in the Principality.
Goginan, Sept. 3. ——— ABSALOM FRANCIS.

MORFA DU MINE.

SIR,—In the present depressing days of mining it is encouraging to find a young mine suddenly springing up into a great success—as the above. Already, I note, 25 tons have been taken from the nearly solid lode of zinc in one week. This alone would amount to 100 tons per month of this valuable metal, no doubt to be greatly increased. Being a practical man, and greatly interested in mining enterprises in North Wales, this mine has attracted my particular attention, as I know the district well, and feel glad at any decided success in this locality. There is also a great event to be decided, in addition to the zinc ore in this property. I refer to the great open-cast or white rock—a continuation of similar conformation to Parys Mountain, which was once so enormously rich. I find good and numerous offers are made for this zinc ore (almost solid) already; being solid it can be taken down at a third of the cost of poor or even rich ore. This mine should command the attention of practical men who want an investment likely and certain to give a very rich and rapid return for the money invested. ENGINEER.

LLANRWST LEAD MINE.

SIR,—A correspondent in the Supplement to last week's Journal appears to be very bitter against the mines of this district and mine agents generally. Is it because so many of them know enough of engineering to dispense with the services of men of his class? He adduced a far-fetched instance of failure—a solitary one—for it is to be presumed that if he knew of another he would have recorded it, and I have no doubt the one adduced is a greatly exaggerated one. But if it is not what has it to do with mining in the Llanrwst district? He strikes out violently at the great Gorse lode, and then squares up at me with the following challenge:—"What has become of the Llanrwst Mine, and my repeated assertions as to its capability for produce?" I answer, the mine is here, and if not crippled by the low price of its produce will accomplish all I have said of it. There is a wide difference, which the genius of "Engineer" does not seem to comprehend, in the working of mines with lead ore at 9*l.* and at 15*l.* per ton. No mine can return as large a quantity at the lower figure as at the higher without sustaining a loss, for the simple reason that the difference in the price of lead is greater than the profit which would accrue on a great deal of ore ground in most mines, and, therefore, there is no alternative but to discontinue working all ground rendered profitless from causes exterior to the mine itself or to work and raise the ore at a known positive loss. Since "Engineer" has evidently intended to slur the mine agents of this district by a reference to an illustration by a case of alleged engineering incompetency of some one down in Cardiganshire, I invite him to inspect the mechanical appliances at this mine, and then to give as critical an exposition as he pleases, or as in his judgment and knowledge he may consider justifiable as to its adaptability and efficiency for the purposes required, in the columns of the *Mining Journal*.—*Llanrwst, Sept.* 4. ——— ROBERT KNAPP.

THE GREAT ELWY RIVER LEAD MINING COMPANY.

SIR,—In the "Notices to Correspondents" of Saturday last "One Interested" is desirous of obtaining some particulars of the above-named company. As, doubtless, there are others who would like to obtain information I send you the following particulars:—The company is a limited one, with a nominal capital of 28,000*l.*, or thereabout, in 1*l.* shares. The working capital was 2500*l.*, and the balance of the 28,000 and odd shares was divided between the parties interested as fully-paid free shares. From the 2500*l.* subscribed capital 1450*l.* went as a cash payment to the vendor, together with some free shares, and the preliminary expenses and a small sum spent on the mines, disposed of the available capital at the outset. A small amount beyond this was subscribed, and a few tons of lead was sold; but, as all their registered capital was disposed of, they do not appear to have been able to raise funds on the credit of the mines, and it, consequently, collapsed beneath the burthen of good things which remained, in the shape of from 25,000 to 26,000 free shares and no capital. Those who subscribed the 2500*l.*, and took to themselves upwards of 24,000 of the free shares as a bonus, may have been deceived; but, if so, they appear to have taken the bait willingly—and, although they may have indulged in golden dreams, they only verified the old saying that "A fool and his money is soon parted." However, so far as the public is concerned, perhaps this was a fortunate occurrence—for, if the promoters had not been deceived, there is every probability the people who might have bought up the 26,000 shares would. But it is a pity the mine, which was a legitimate speculation, and had made profits from shallow workings, should be doomed by such unminer-like mining, and the tradespeople, agents, and workmen be deprived of their money. Would it not be more honourable to wind-up and reconstruct? A moderate sum would discharge the liabilities, and prove the value of the property; or it might be handed over to somebody who knows how to work it, when everyone concerned would know how they stood, and the directors would be rid of their present incubus. ANOTHER ONE INTERESTED.
Sept. 4.

BEDFORD UNITED MINES.

SIR,—The circus-like movements and pantomimic character of the proceedings at this mine assume at present a very romantic aspect, and is locally very enigmatical. Tell it not in the counsels of the wise. Publish it not where practical men do congregate, lest the whole drama be had in derision, and the actors be held up to scorn. The local shareholders and people resident in the neighbourhood had formed a gratifying conclusion that the manager had relinquished the mine in favour of public business, a calling most congenial to his nature; but there are combined in this gentleman such excellent qualities that, whilst his presence may be required to preside over his business 25 miles apart from the mine, such will be the power of his magic wand in exercise at the mine that it will at all times command respect, and be powerful to work the mine quite in keeping with the spirited requirements of the times. We had hoped that the vehement resolve of the manager to sever his connection with the executive would result in the re-establishment of Capt. Phillips, and again anticipated prosperity; but it is now generally understood that Capt. Phillips's services will not be required, and that he will go to farm an estate left him by his late and worthy father. We wish him all prosperity.

As Capt. Phillips will reside within an easy distance I would suggest, in order to secure the benefit of his practical knowledge gained by upwards of 30 years experience at the mine, that an endeavour be made to elect him as a practical element to the directorate to represent the local interest, and friends holding, probably, one half the mine. Let him be put in nomination at the next meeting for the first vacancy that may occur, or be kept in view for the next election. Let him be requested to visit the mine at least once a month, and examine its affairs both underground and at surface, and let remuneration be proffered to induce him to act as local director.
Tavistock, Sept. 5. HERBERT MINTON.

THE WILD DUCK, OR SPORTMAN'S ARMS.

"I thought I should be late, to-day," says Jan Temby, "but coming up here I mit Cudden Har T——" "Never mind," says Uncle Henny, "eat the denner first, Jan, and tell about Cudden Har after." "Well, men," says Jan, after a had tucked in a good denner, "Cudden Har was telling me how his pare got on last month. Well, his pare have been in a end for twelve months, and worked hard, but do their best the' could't knack more than 3*l.* 5*s.* a man a month out of the old end. Last month the' took again old price, 7*l.* a fathom for the month. Well, after working three cores the' cut a purty flookan, and in a fortnight the' drove over 7 fms. of ground, when the old end got tighter and uglier than ever; in the next fortnight the' barely drove 3 ft., tho' the' throwed to un like men, hoping the ground would get better again, but a ded'nt, and got wuss! Now, what price do ee think the Cap'n's put upon un the next survey day?" "10*l.* or 12*l.*, I suppose," says Jemmy Dowa, "or how could men get a living?" "No," says Jan, "the price fixed wor 5*l.*; when the best miner living could not get 50*s.* a month in 10*l.* a fathom! and the old pare had to take 'n or be out of employ. The next time the Cap'n come down in the end Cudden Har ax'd 'n where his conscience wor—he being a religious man—when he put the price upon the end? 'Do you know,' says he, 'that we are not allowed to set for men to get more than 55*s.* or 60*s.* a month?' 'Why, no man living,' says Cudden Har, 'could get 15*s.* a month by your last price.' 'Ah!' says he, "see what you got last month?' 'But,' says Cudden Har, 'do ee mean to say, like a honest man, that 7*l.* a fathom last month was a price in sight for men to get more than 50*s.* or 60*s.* a month?' 'No, it was not,' says the Cap'n. 'Well, then, the truth is,' says Cudden Har, 'if we get a few pounds *this* month you'll take it away again *next* month, and poor men are abused because the' don't work harder. Now I tell ee what it es,' says Cudden Har, 'men will never have courage to work hard till they have justice and fairplay; and if a man got 10*l.* by honest hard work in his bargain last month, give him a fair price in sight for the same bargain for next month, and set for the month without any reference to the past, and you may depend upon it the men will work hard enough, and the adventurers will find it to be the cheapest work, as two fathoms for one will be done. Give the men fair play—a fair price in sight—and so much as the' can do in the month—and it will be discovered that four-weeks months is downright nonsense.'" "Well, Jan Temby," says Uncle Henny, "we and every miner in the parish ought to thank Cudden Har for what he told the Cap'n, for we all know what he said is so true as the Gospel." "People may say what the' mind to," says Old Tom, "but if a man work this month, and jest kill hisself trying to do some good for his family, all the encouragement he'll get he's price will be cut for next month; and the lazy fellows and tea-drinken excursion men are better off than the slaving hardworking man." "Everything," says Jan Jewill, "is put down upon the poor working miner; but, by all accounts, there is room for improvement in other quarters. In old times we had bad shafts, bad engines, &c., and still the engines then used to do more duty than the engines do now with all the improvements—new shafts, new pitwork, learned societies, &c. I do think, if some of the old miners and engineers, who died long ago, could come back again and see what is doing, they would tell some of our big ones that the're not half so clever as the' think the' are, and wish other people to think; or the ma-

chinery and everything else would be in a different state. I wonder how our engineers would contrive to get up steam in a 'Moorstone boiler'?" "Who ever heard of such a thing," says Old Tom, "as a 'Moorstone boiler'?" "I have," says Uncle Henny, "and did know men who see'd the pieces of one that worked in 'Cherry-gairn old bal.' Wonderful improvements have been made since the' days; but up to and beyond a certain time our engineers seem to be declining instead of improving; for, look at the present duty of the engines and the past, to say that engines are old and shafts deeper is a lame excuse." "But where is Cherry-gairn old bal?" says Jemmy Dowa. "It is a little below Tuckingmill," says Old Tom, "and some of the old shafts are very near 'Jolly Tom's Hotel.' All Brea valley, the valley district—bottom of the hill—of Dolcoath, and all the way to and beyond Tuckingmill was once full of gardens and orchards. The old name of Dolcoath was 'Bullom-gairn' (wild plums); then to the west is Dunkin's-gairn, and a little beyond Tuckingmill is Cherry-gairn, and also the old bal of that name." "I think," says Jan Temby, "after a pleasant mitten we ought to do like Capt. Tom ——. Every morning when Capt. Tom went to the mine, after going to the 'count house, he would go to the kitchen and say, 'Well, Joney, what's for dinner?' 'Oh, a beautiful leg of mutton, Capt. Tom.' 'Very good, Joney;' and then he would begin to sing 'Praise God from whom all blessings flow.' On other days, he would say 'Well, Joney, what's for dinner to-day?' 'Oh, nothing, Capt. Tom!' Then he would begin to sing 'How feeble is our mortal frame.'"—*From Cousin Jack's Unpublished MSS.*

ELECTRO-DESILVERISATION OF LEAD.

The desilverisation of argentiferous lead is unquestionably one of the most important metallurgical problems, and, with regard to Keith's process, recently introduced in America, the New York Iron Age remarks that it is the first ever proposed for directly separating, without the aid of fire, an alloy of silver and lead in which the former is present in a small percentage only. Mr. Keith, who occupies an acknowledged position as an authority on electro-metallurgy, has by the application of electrical force to the metallurgical treatment of metals, opened, it would seem, a new field in metallurgy which promises a rich harvest. The new method is remarkable for its simplicity and the absence of any causes which might entail losses of metal. Until 1829, when Pattinson invented his process, no other means of desilverisation was known than cupellation, or conversion of the lead into oxide, which left the bulk of the silver behind in a metallic state. Pattinson's process was based upon the fact that when melted argentiferous lead is allowed to cool crystals are formed which are poorer than the original alloy. By repeated crystallisations the silver was concentrated in a smaller amount of lead. This process has, however, been almost universally superseded by Parkes' process of desilverisation by zinc, which is based upon the fact that when a small percentage of zinc is added to argentiferous lead a rich alloy is formed on cooling, consisting of silver, lead, and zinc, which, as it is lighter than the lead, floats on the surface, and may easily be skimmed off or separated by liquation. This rich alloy is distilled in graphite retorts to remove the zinc, and the rich lead obtained is cupelled. The process is one of concentration rather than of absolute separation. It still requires cupellation—a costly and wasteful process. Its chief disadvantages are a considerable loss of metal, amounting approximately from 3 to 5 per cent. of lead, according to the purity of the metal, and from 3 to 5 ozs. of silver to the ton. The multiplicity of the products is a serious item, as it is necessary to keep the products of refining separate from the rich products of desilverising, and to keep apart the poor products from refining the market lead. This calls for a multiplicity of furnaces, and, therefore, for a large plant. The separate reduction of the products makes it necessary to accumulate large stocks before it is profitable to work a product, so that the interest on the stock is heavy. These facts add greatly to the cost of the process, and have stimulated metallurgists to seek some means of obviating them. They were partly directed to the application of mechanical contrivances for desilverising proper, and partly to the introduction of special processes of working the rich alloy of zinc, silver, and lead, but they did not prove successful.

Hitherto the merits of Keith's process has only been tested on the experimental scale, but it is considered to possess many features of promise. The lead from which the silver is to be separated—or, as it is technically called, the bullion—is cast into thin slabs, over which muslin bags are drawn. These are hung in vats filled with a solution of acetate or chloride of lead, which is acidulated in order to prevent the formation of basic salts. Alternating with the slabs of bullion are sheets of metal not affected by the solution, such as copper or lead, preferably the latter, in order to prevent the possibility of any admixture of copper with the precipitated lead whenever it should become necessary to scrape the plates. The bullion slabs, the anodes, are connected by means of conductors with the positive pole of a dynamo-electric machine, while the sheets of metal, the cathodes, are connected with the negative pole. The electricity generated by the machine causes the lead of the anode, the base bullion, to dissolve and deposit on the positive pole the sheets of metal. With the exception of zinc, lead is the most electro-positive of the metals contained in the acetate or chloride solution, so that antimony, arsenic, tin, bismuth, silver, copper, and gold remain behind, while pure lead is deposited on the cathodes in the form of fine crystals, which fall to the bottom of the vat, while the precious and accompanying metals gather in the muslin bag. Zinc when present goes into solution, which it would tend gradually to make unfit for the work. As the bullion is cast at a low temperature its amount cannot reach more than 1 to 1½ per cent., as lead does not retain more than that quantity. Zinc can, however, be electrically deposited in properly arranged vats.

It has yet to be determined by practice whether it will prove more economical to refine the bullion previous to separating it or not; but it is claimed that by using crude bullion the antimony which remains with the silver may be utilised by treating the products of refining the silver with nitrate of soda and borax, and that the losses of metal are reduced to a minimum by the absence of any process subjecting it to the action of fire. On the other hand, it should not be lost sight of that as arsenic and other metals are invariably present also, the separation is by no means a simple one, and that previous refining will yield silver of great fineness. The refining of the silver, too, is an additional operation, while it is a principle of metallurgy to handle a product less the richer it becomes. The completeness of the separation will be readily judged of when it is stated that the bullion treated contained 96½ per cent. of lead, ½ per cent. of silver, ½ per cent. of copper, 1 per cent. of antimony, 1½ per cent. of arsenic, with traces of zinc and iron, whilst after treatment traces of arsenic and antimony were the only foreign metals that could be detected. Experiments made on a small scale have shown that the dissolution of the bullion is quite irregular, so that the disadvantage of regular corrosion and the mixture of particles of lead with the fine silver are avoided. Should this prove so on a large scale the cost for remelting the silver would be low. A circumstance which may prove a great advantage to the electro-magnetic deposition of lead is its form, so favourable to a rapid and complete action of the chemical agents used in corrosion for the manufacture of white lead. It is estimated that by the Keith process the desilverisation is effected at one-third the usual cost, exclusive of value of allowances made for loss of lead and silver.

LIFTING AND HOISTING TACKLE.—Between two side plates or frames Mr. J. A. COLLET, of Offenbach, Germany, arranges in a vertical line two worm-wheels and drums running in bearings in the side plates. Above the top drum and connecting the two plates is a cross head, with swivel hook for supporting the load. Between the worm-wheels and gearing into them is a worm or screw, and at the end of the worm shaft is fixed a rope or chain pulley. Another method of arrangement is by setting the worm wheels in a horizontal line, and driving them by two worms having the rope or chain wheel between them. Attached to the drums is a long chain passing through a pulley block, or fixed to a swivel hook for carrying the load. Over the wheel is passed a rope or chain for hoisting. When the rope wheel is turned the drums, which are of the same diameter, wind or unwind as required, the chain carrying the load, and will hold it in any position by means of the worm, which acts as a brake when not being turned by the rope wheel. Another arrangment is by substituting clip pulleys for the long drums, so that instead of the chain being continuously wound round it is merely passed over the pulleys, and the ends allowed to hang free, the other parts of the apparatus being the same as before. The pitch and diameter of the worm-wheels and barrels may be varied to suit the weight of load and speed of lifting.

CORNISH PUMPING ENGINES.—The number of pumping-engines reported for July is 16. They have consumed 1238 tons of coal and lifted 9·2 million tons of water 10 fms. high. The average duty of the whole is, therefore, 50,500,000 lbs. lifted 1 ft. high, by the consumption of 112 lbs. of coal. The following engines have exceeded the average duty:—

	Millions
Dolcoath—85 in.	59·1
Mellanear - 76 in.	56·2
Mellanear—Gundry's 80 in.	54·5
West Wheal Frances—58 in.	54·9
West Tolgus—Richard's 70 in.	52·2
West Wheal Seton—Harvey's 85 in.	72·4
West Wheal Seton—Rule's 70 in.	74·2

Meetings of Public Companies.

GENERAL BANKING COMPANY (LIMITED).

The first general meeting of shareholders was held at the Banking House, Cannon-street, on Wednesday,

Mr. ALBERT GRANT in the chair.

Mr. J. F. COPELAND (the secretary) read the notice calling the meeting.

The CHAIRMAN said that according to Act of Parliament it was necessary for every limited liability company to hold a meeting within four months of its registration. He did not exactly know the object of that, because it might well happen that the four-monthly meeting might come round even before the company had commenced business; and, therefore, naturally there would not be much to tell the shareholders regarding the business. In this case it was some time since the bank was registered; but as it had only been over two months in operation, the directors had not much to say to the shareholders. Probably it was to let the shareholders know the exact amount of capital subscribed that this clause had been introduced, and he would tell them the exact figures as to the share capital subscribed. The total number of shares allotted was 3680 at par, and 94 at 1*l.* premium, and 1000 founders' shares had been allotted, so the total amount of share capital was 3774 ordinary shares, and 1000 founders' shares. Since the bank had been established the time had been too short to do much, and at the statutory meeting it was not usual to give any accounts; therefore, he had only to make the formal statement that that was the position of the company with respect to the share capital. The bank was extending its influence and connections, and the directors hoped that when the time came round for rendering the accounts they would be able to give a good account of themselves, and also a satisfactory return to the shareholders. (Hear, hear.) There was no resolution to be proposed, but he should be happy to answer any questions.

Mr. MAXWELL said he wished to call attention to one point in connection with the issue of shares. Some time since he received a circular from the bank stating that of the 10,000 shares of the first issue 6000 were to be issued at 1*l.* premium. Now, he thought that those shares should be issued at par to the existing shareholders, who came into the bank when the commercial horizon was clouded with war alarms. The general public might be asked to pay a premium; but certainly the shareholders who took the risk in the first instance, and subscribed the money, should be allowed to take the shares at par. No doubt the directors were perfectly justified in placing a premium upon the shares, but it would be a fair thing to allow such of the shareholders as chose to increase their interest in the bank by taking those shares at par. He merely put that forward as a suggestion, without in any way questioning the acts of the directors.

Mr. INGERSOLL said he agreed with the last speaker. He went to the office one day to take up a certain number of shares, as he thought well of the bank, and he was told that he had 1*l.* per share more to pay, and he paid it reluctantly. He thought the shareholders should have the privilege of taking the shares at the same price as the others. He should have taken 1000*l.* more had it not been for the premium.

The CHAIRMAN said that other gentlemen had also stated to the directors that they thought that the persons who had taken the shares in the beginning, when times were somewhat less propitious, should now have the opportunity of taking these shares at par up to the first 10,000 shares offered; but the directors felt that as 94 shares had been issued at 1*l.* premium they ought not to rescind the intention to allot those, no matter to whom, at a premium without the sanction of the shareholders at the first meeting, and, therefore, the directors had stated in reply to the shareholders that having fixed 1*l.* per share premium for any shares subscribed after the allotment had been closed they could not alter that for the present. But, of course, the directors had no desire in any way to act arbitrarily, or with anything like sharp practice. There was a date fixed for the first allotment; but, as the suggestion had been made that the shares should be allotted to the existing shareholders (but not to the outside public) at par, the board had considered the question, and they left the subject to the shareholders themselves to decide. It was only a matter of something like 6000*l.*, and the desire of the directors was that the premiums should go to build up a reserve fund. There were 20,000 shares in due time to offer, and if the shareholders generally thought that they ought to be offered to the existing shareholders at par, and to the general public at a higher price, it could be done. Perhaps the shareholders generally would pass some resolution on the subject.

Mr. EVANS said that if the remaining shares were issued to the existing shareholders at par the premiums already paid must be returned to the shareholders. After all, the matter was as broad as it was long, because the premiums paid went to the benefit of the shareholders. He had no feeling in the matter himself, and should probably take some more shares.

The CHAIRMAN said it was not a very important question as far as the amount was concerned, as it only involved a question of 94*l.*; and looking at the fact that the first issue of 10,000 shares was not yet complete, he thought there could be no objection to the remaining shares being issued at par to the shareholders. It was as broad as it was long. The question which was involved was putting 6000*l.* to the reserve fund earlier than they otherwise would do, but the bank was very young, and could afford to wait a little longer for that. Upon the whole, he was disposed to think it would be better policy to allot up to 10,000 shares, and no more, at par to the existing shareholders only.

On the motion of Mr. MAXWELL, seconded by Mr. INGERSOLL, the following resolution was then passed:—"That the unissued shares up to 10,000 be offered to the existing shareholders only at par."

A short discussion ensued as to the mode of dealing with the small amount of 94*l.* already paid in premiums; and the CHAIRMAN stated that the matter could be easily and satisfactorily settled by applying the amount already paid to the credit of any additional shares applied for at par.

On the motion of Mr. INGERSOLL, a vote of thanks was passed to the directors, and the meeting broke up.

SOUTH CARADON MINING COMPANY.

At a general meeting of shareholders, held at the mine on Tuesday (Mr. RICHARD KITTOW in the chair), the accounts for the fourth, fifth, and sixth months showed a profit of 520*l.* 17s. 7d. A dividend of 512*l.* (1*l.* per share) was declared, and the balance of 254*l.* 18s. 11d. carried to credit of next account. The following report was read:—

Sept. 3.—It is with pleasure that I have again to inform you the mine continues very productive, and you are enabled to declare 1*l.* dividend; this I consider is rather better than we might expect when we take into consideration the very low price of copper. We are returning large quantities of ores (about 480 tons every four weeks) of good quality, and should the price of copper improve your dividends will increase.—JOHN HOLMAN.

CARN BREA MINING COMPANY.

A six-monthly meeting of shareholders was held at the mine on Saturday,—Capt. TEAGUE (the purser and manager) presiding. A large number of adventurers were present. The accounts showed the total payments to be 18,783*l.* An extra month was also charged up, so that really there were seven months' costs instead of six; merchants' bills, 5786*l.*; carriage, 900*l.*; dues, 458*l.*; doctor's pence, 89*l.*; Vice-Warden's assessment, 22*l.*; Illogan parish rates, 64*l.*; Bolitho Sons and Co., bankers' interest and commission, 737*l.* 18s. 3d. On the credit side there was for copper ore, 579*l.*; tin (615 tons), 21,739*l.*; total expenditure, 26,844*l.*; and total credits, 22,554*l.*: leaving a loss of 4290*l.* The agent's report was very favourable.

The CHAIRMAN explained that their heavy loss was partly owing to the fact that there was a difference in the price of tin of 2*l.* 7s. 9d. per ton less since their last meeting, which meant a loss of 1460*l.* on the amount sold during the last six months. Then there was the extra month's cost, which amounted to over 2100*l.*; over 3100*l.* had been paid to the Boring Machine Company, and the pumping engine had been restored, so that putting all those things together they would find that it would amount to over 6900*l.*, so that really the mine had made no loss but had paid its costs and something better. Had it not been for those drawbacks they would have had a profit. The real profit against the adventurers was 31,279*l.* The question for them to decide was whether they should carry on that balance or whether they should face the difficulty as it was, relieve themselves of the debt and be independent and work their own business with their own money. He believed the money had been judiciously expended and that eventually they would receive some benefit from it. They had paid 32*l.* per fathom for driving with the boring machine, which had driven at an enormous rate. At present they were sinking. In driving with the boring machine there was a very considerable saving to the adventurers, but there was not in sinking. Indeed, the machine would not sink faster than it could be done by hand labour. Since the machine had been there they had driven 189 fms 4 ft. at a cost of 4912*l.* to the adventurers, and they had received little or no benefit from the driving. Probably they were aware that provision had been made for having boring machinery of their own, towards which Mr. Basset had generously offered to give 1000*l.* They had certainly been benefited by the boring machine coming amongst them, as they could drive very much faster than by hand labour.

Mr. TREGLOWN said their average driving was from 23 to 25 fms. per month.

The CHAIRMAN said the next business they had to deal with was the heavy balance due to their bankers, and whatever call they made it was sure to be talked about, and they were sure to feel it. He thought they must look the thing in the face, and decide upon making a call. The question was whether they should work their own money, or pay 7½ per cent. to their bankers. He thought the time had come when they should meet the question as business men. He had drawn up a resolution, which it was for them to adopt or reject, to the effect that a call of 20*l.* per share be made payable in four instalments—first to Oct. 8, 1878; second to Jan. 9, 1879; third to April 8, 1879; and fourth to July 10, 1879. Also that 5 per cent. discount be made for prompt payments, and that 5 per cent. per annum be charged on all remaining unpaid a month after the instalments became due. That was his view of the matter, and he would have to pay a fourth part of it.

Capt. HENT thought that what the Chairman had proposed was about the best course to adopt. It might pinch them for the time, but they most meet the matter as honest men, and thus save the very heavy bankers' charges. He thought they would do a wise thing by passing the resolution.

The resolution was put to the meeting and carried unanimously.

The CHAIRMAN said since the boring machine had been there it had cost them for driving 4912*l.*, but they had paid the boring company more than that money, because in the first contract they were subsidised to the amount of something like 1000*l.* towards bringing the machinery on the mine, so that really the mine had paid to the Boring Machine Company nearly 6000*l.* He the (Chairman) then read a letter from Col. Beaumont accepting the offer to drive two levels in Carn Brea and to sink the high burrow shaft 12 fms. under the present 226 fm. level by the end of June next (this year).

Capt. TEAGUE said, June was passed and they were then in the last day of August, but the shaft was not sunk as agreed. The price agreed for driving was 32*l.* per fathom, and for sinking 50*l.* per fathom, the levels to be driven at not less than 10 fms. a month. The driving was being done rapidly, but they had gone off the lode. The lode in the shaft was valued at 30*l.* per fathom, and was only 12 or 15 fms to the west in the present end of driving.

A letter from Col. Beaumont was read by the Chairman, stating that he was willing, upon certain conditions, to enter into a second contract with the Carn Brea shareholders, but the Chairman recommended the completion of the first contract before entering into a second one. They undertook to drive the 226 by the end of June, but as they had not completed it the agents were prevented from making any exploration on the lode. In driving the level they had not carried out the instructions of the agents. Consequently they were off the lode, and they (the agents) did not feel justified in paying 32*l.* a fathom for them to go in search of a thing they were previously working on, and which, had they followed the directions of the agents, they would probably have been on still.

A resolution to the effect that the first contract entered into be completed before entering into a new one was accordingly passed.

Mr. E. HEARD said he thought that once in three months was a reasonable time for the adventurers to meet together and confer with their managers. He did not suppose that the step taken at the last meeting was a well-advised one. He was opposed to adventurers having large overdrawn banking accounts, and he was opposed to another thing. That day they were called upon to pass 22 000*l.* worth of bills at a moment's notice. He believed everything had been done for the best, but he must say that in an important mine where they were spending 50,000*l.* a year, that the accounts should be sent to the adventurers at least a week before the meeting. Now that they had taken the bull by the horns he thought they would clear off the debt to a considerable extent, and he trusted that the purser of the mine would in future send out the accounts a week before the meeting took place.

The CHAIRMAN observed that at the last meeting there were certain things that had to be done, and he thought it advisable that the meeting should be put off for six months. That they were in a far better position than they were three months since, and it was by general consent that the meeting was deferred. He had never been a very great advocate for more than three-monthly meetings, but at times things "cropped" up which made it necessary to put them off for six months. With regard to sending out the statement of accounts a week beforehand it might answer or it might not. There could, however, be no possible objection to the book being laid open for one or two hours before the meeting took place, but to send out accounts a week beforehand would, he thought, be rather objectionable.

A few other remarks followed, and the meeting separated.

TINCROFT MINING COMPANY.

A meeting of adventurers was held at the mine on Saturday,—Capt. TEAGUE (the manager and purser) presiding. There was a large attendance of shareholders. The agent's report stated that there was no alteration in the engine-shaft since last reported. The mine was in a very good position for returning tin.

The CHAIRMAN said there was some unpleasant business to perform, as the mine was in debt to the bankers 13,534*l.*, and altogether their liabilities amounted to 18,461*l.* He would propose a resolution to the effect that a call of 30*s.* per share, payable in four instalments, be made, with 5 per cent. discount for prompt payments, and if they were not paid when due interest of 5 per cent. would be charged.——This was carried unanimously.

The CHAIRMAN then said that the new skip-road that had been recently put in answered remarkably well, and would be the means of effecting a very great saving to the mine. They were never selling more tin than at present.

Capt. PRYOR mentioned that as they were paying a large amount for dues, Lord Robartes should be applied to for a reduction or remission of them during the depression. Lord Robartes had done so at West Tolgus, and he thought that his lordship would be equally generous to Tincroft if applied to. He would propose that Lord Robartes be applied to for a reduction or a remission of the dues at pleasure.——Mr. HARRIS seconded it, and it was unanimously agreed to.

Captain TEAGUE said that about 22 years ago when he became connected with the mine it was in debt. They made a call of 9000*l.*, and since that time they had divided about 270,000*l.* in dividends, and paid Lord Robartes a considerable sum in dues. The mine was not half as good then as now. (Hear, hear.) For some time the workings had been limited at Tincroft. The ground was being drilled, and it was evident they were on the wrong lode. Between that and next meeting they would know more about it. They had already sunk the winze something like 20 fms.—*Western Daily Mercury.*

H. BRIGGS, SON, AND CO. COLLIERY COMPANY (Limited).—At the annual meeting held at Whitwood, near Leeds, Mr. H. C. Briggs (the Chairman) moved the adoption of the report, which declared a dividend of 3 per cent., and said the year past had been one of the most anxious he had ever had; but the result had been to this company a gross profit on the year of 12,690*l.* 9s. 7d., after deducting the usual amount for depreciation. Mr. A. Briggs seconded the adoption of the report, and said that since he met them last he had travelled in France, Italy, Switzerland, and the Brazils, and everywhere he found the same complaints of bad trade. Many people said that England's supremacy was going. To a certain extent that was so, he believed, and to hold our own we should have to work much harder than in times past. Foreign countries which formerly took our goods were now producing their own, often cheaper than we could do, and sometimes of better quality; therefore it was that we should have to work harder in all branches of trade to keep pace with our foreign rivals.

GOLD OF VICTORIA.—The Melbourne Argus reports a "rush" for gold near Berlin in the Dunolly district. A Chinaman, working at a place in that district called Jericho, found, on June 23, a nugget weighing 400 ozs., and the unearthing of such a magnificent lump of gold drew many miners to the ground. But the reports of the Government Mining Surveyors and Registrars of the colony for the quarter ending March 31 show a continued decline in the quantity

of gold raised. The quarter's yield is computed at 168,428 ozs., or nearly 14,000 ozs. below the corresponding quarter of last year. The gold exported from Victoria in the first half of the year 1878 is stated at 160,143 ozs. or 74,970 ozs. less than in the first half of last year.

THE MINERAL WEALTH OF NORTH CAROLINA.

An important memorial has been presented to the United States Congress with regard to the development of the mineral resources of North Carolina, and in connection with it some interesting statistics have been collected by the Mining Board of Charlotte, North Carolina. The memorialists believing, as all must believe, that the future prosperity of the United States depends to a great degree upon the development of her mineral wealth, call attention to the fact that the gold producing area of North Carolina covers about 12,000 square miles, containing 140 mines already more or less developed, also containing large coal, iron, and copper areas. The official reports show that the yield of gold was in North Carolina $10,370,492; Georgia, $7,451,592; Virginia, $1,641,344; and South Carolina, $1,382,455. With regard to the geological distribution of mines it is stated that the best known mines are upon the central belt of granite stretching across the State in a north-east and south-west direction, with a width of 10 miles to 25 miles, the town of Greensboro and Charlotte being nearly in its axis. This area is commonly regarded by geologists as among the oldest on the North American Continent. To the east is a large body of slates, generally argillaceous, with a width varying from 15 to 50 miles; this region also abounds in mines, but it has been less explored. To the west is a still larger area made up for the most part of gneissoid and schistose formations, and extending nearly or quite to the Tennessee border. This area, too, has a large number of mines, but the most valuable deposits are placers and gravel washings.

The early history of gold mining in North Carolina is particularly interesting. It is highly probable that gold was mined in this State as early as the Revolutionary war, but only in a small way by washing beds of streams. The discovery of the famous 28-lbs. nugget at the Reed Mine, in Cabarrus county (then Mecklenburg) occurred in 1799, but regular operations were prosecuted only some years after; by the year 1825 the Carolina gold mines had become well known at the North and abroad. A Legislative report of 1830 puts the ascertained production at $500,000 per annum. Thus far work had been done only on placer mines, but the speedy exhaustion of these compelled the miners to hunt the veins which had been the source of such riches. The large number of veins found put entirely new conditions to this now important industry. Neither the circumstances, the knowledge, nor the skill of that period were favourable to operations planned on a scale or with aims such as we now witness in our Western Territories; had they been so the entire industrial condition of the State would have been completely changed; to this day nearly all mining work has been of the most desultory character. The veins were worked generally by farmers, who spent their odd time in these enterprises, using their slaves (otherwise unoccupied) as miners. The waste attending such random work was enormous, but as ores were abundant and rich, and easily and cheaply treated, there was no incentive to economy. When the permanent water-line was reached—generally at the depth of 40 to 60 ft.—the ore changed to refractory sulphurets, and as expensive pumping and hoisting machinery was necessary, and as all operations needed to be continuous, the work, as then conducted, ceased to be profitable, and mine after mine was discontinued; the larger number remain abandoned to this day. The five years preceding the war witnessed a revival of mining industry, and a real progress was made towards a mastery of the methods of dealing with sulphurets in an economical and thorough manner. But the all-absorbing issues of that struggle diverted all efforts in this direction, and at its close but one mine was in operation, and that only in a fitful manner.

It is considered that, so far as concerns the future, the dependence of the country will be on deep lying ores containing 15 to 30 per cent. of sulphurets, mainly iron pyrites; occasional bunches of copper pyrites are found in a large number of mines, which is sometimes present in proportions large enough to be smelted for copper alone, though in any rationally conducted treatment the contents in gold and silver are important enough to give a good margin of profit. From a large number of analyses made from ores of every variety and from numerous mines, it may be said that there is hardly one which will not yield ores ranging in contents from $50 to $500 per ton, and not unfrequently pockets of ore are met with which will for weeks average $50 per ton, but by far the greater quantity of ore mined will not reach to the half of this. Were our mines running up to their capacity it would be easy, by a simple picking, to obtain ores of $50 value. Galena occurs in a few mines in small quantities, and it is generally rich in gold and silver; blende is a frequent accompaniment of galena; arsenic and antimony are rarely present in more than traces. Nickel in workable proportion has never been met with, though it is often present in minute quantities. The south end of the central belt has been most explored, and the larger number of known mines are within a radius of 20 or 30 miles of Charlotte. But doubtless the number of miles in the northern portion and also in the eastern belt, would have been larger had equal care been given to their exploration.

Commencing with the Central Belt, an enumeration of the most important mines of which is given in the report accompanying the memorial, the most prominent mine hitherto has been the Rudisill; it comprises two parallel veins—easily operated by the same shafts—which have an average combined width of 8 ft. This mine, after standing some years, has recently been reopened, and new levels driven from the bottom of the old pump-shaft, at a depth of nearly 200 ft. The vein at this depth is of somewhat greater width than usual; a carries a considerable amount of sulphuret, apparently of good grade. A small percentage of copper is found in the ore. The records of the past yield of the mine are defective, but it is credited by persons familiar with its history with a production of $1,000,000. The Clark Mine is about one mile west of the Rudisill. This mine has borne a good reputation. The Davidson Mine, or group of mines, 1½ mile west of Charlotte, furnished an abundance of ore down to the water-line; when abandoned the ore was said to have been of good grade, but too refractory to be profitably worked with the appliances of 20 years ago. Similar statements may be made of the Trotter Mine, to the south-west of the Clark. This mine is cut by the Atlanta Railroad. The Capps Mine, five miles west of Charlotte, is another of the great mines of this section, and has yielded even more liberally than the Rudisill. The greatest depth reached is 200 ft. There are two converging veins, one of which, at its north end, passes into another property, and is known as the McGinn Mine. Both veins are wide and strong, and have given superior ore. It is not worked at present. The McGinn Mine is one of the few mines of this section now in operation, and is at present in "bonanza." The north end of the vein has yielded a high grade of copper ore, while the south end is for the most part auriferous iron pyrites. The ore bodies at present are of unusual width and of good grade; the assays of it have been very flattering.

The Slate belt is best described in a general way as argillaceous, but other varieties often occur. This belt, like the granite belt previously discussed, abounds in mines of gold, which often carry silver, copper, and lead in considerable quantities in addition. Forty mines are known to the mining board in South Carolina, most of which lie in this formation; three only have been worked to any extent, or have acquired any great notoriety.

The Dorn Mine, in Abbeville, is the best known. Perhaps no mine in the United States has given such rich ores, and in such quantity, as this once famous mine. It is not known that any record has been kept of its production. The Brewer Mine, 52 miles south east of Charlotte, is one of the most peculiar in the gold mining region of the South. Most of the eminence on which the mine is situated is ore, but of so low grade that it can be worked successfully only by the treatment of immense quantities. The Hale Mine, south-west of the Brewer, has been worked to the depth of 100 ft. The ore is relatively low grade, and as it contains a large per cent. of sulphurets it has proved too refractory to work with the appliances now in use. Gold Hill Mine, in Rowan county, 15 miles from Salisbury, was discovered in 1842, and has been more extensively worked than any mine in the State. Only two of its veins have proved of workable value—the Earnhardt and the Barnhardt, the former having been exploited to a depth of more than 700 ft., and ore of fair quality has been found to its very lowest point; a small per cent. of copper is an almost invariable constituent. The large bodies of ore have allowed this mine more than 20 years of continuous and for the most part profitable work. During the war work was suspended, and since the surrender the operations have from lack of capital been too desultory to do justice to this fine property. The production of Gold Hill has been at least $2,000,000.

Ten miles north of Gold Hill is Silver Hill, notable as being the only lead mine in North Carolina thus far deemed workable; the lowest workings are more than 600 ft. in depth. The ore is argentiferous galena, with a large percentage of blende. There are other localities near Silver Hill which promise to yield ore of a similar character. The Ward Mine is in Davidson county, 15 miles east of Lexington. It is both a surface and vein mine. It was favourably noticed by Prof. E. Emmons, the late State Geologist. The counties of Montgomery and Stanley are known to abound in the precious metals, but being remote from the highways of commerce, little has been done in the way of exploration. The Steel and the Russell Mines are the only ones of more than local importance; the latter yields an enormous body of low grade ore, and is now worked. The gravel mines of Montgomery are attracting deserved attention, and the Christian Mine is the best known example of them. Only a small excavation has been made in the bank, but even this, with an inadequate supply of water, afforded large and gratifying results.

On the third, or Gneissoid Belt, the most noted Mine is the King's Mountain. It is situated 40 miles south-west of Charlotte, and one mile from the railroad from Charlotte to Atlanta, and on the northernly part of the King's Mountain ridge, of revolutionary fame. The mine is in limestone, and the ore is altogether unique. The ore body is made up of lenticular masses of impure carbonate of lime (the immediate associate of the gold is a mooted question). In places it is composed of the ordinary brown ore of the gold mines of this region. The body last exploited varies from 6 ft. to 30 ft in thickness, which for the most part is workable material. The ore is usually free from sulphurets; a former chemist of the mine says it carries only 3 per cent., composed of galena, blende, tetrahedrite, iron and copper pyrites, telluret of lead, and, perhaps, telluret of gold. The ore is low grade, but the great width of the vein, the ease and cheapness with which it is mined, the facility with which it is crushed, and the relatively large proportion of gold which can be extracted have made this mine a favourite. For years it has made a more steady return than any other mine in this section. The yield of gold is probably about $750,000. The greatest depth is about 250 ft. The Crowder's Mountain Mine, four miles to the north-east, has large bodies of ore, but they have not been sufficiently explored to justify any assertion as to the value of the mine. Valuable bodies of barytes are known to exist on this mountain.

The Copper Knob Mine, in the south-east part of Ashe county, is worthy of notice in this connection. The vein has the most marked characteristics of a fissure vein; it has been cut at a depth of about 40 feet, and found to be from 18 to 36 inches in width. This deposit has yielded some beautiful peacock copper ore of high value both in copper, gold, and silver. It is one of a group of mines, but none of the others have been explored. Vein mining in the mountains has been little followed, the veins rarely being of any size that would yield a profitable return. The Baker Mine, on John's river, near the mouth of Wilson's Creek, Caldwell county, is a notable exception; the Michaux Mine not far distant has also acquired some notoriety. Gravel mines have, however, been largely worked. The most noted localities are in Brindletown, Bracketown, Whiteside, and Jamestown in McDowell and Rutherford counties; Sandy Plains and Pacolet River, Polk county; Fairfield Valley, Jackson county; Valleytown and Vengeance Creek, Cherokee county—the gold belt of Cherokee probably extends into Georgia. Many of these gravel mines have been worked forty or fifty years, and are still productive.

The Mining Board does not feel at liberty to dismiss this portion of its report without some allusion to the past and some consideration of the future of this industry. Prior to the war the old fashioned Carolina gold mill was the chief machinery relied on for milling, and with attention to the details of its work did well. Nothing equal to it has since been introduced. After the war the California stamp battery was generally substituted, but with an exception here and there it has proved lamentably inefficient for amalgamation purposes, though admirable as a crusher. Hereafter the prosperity of our mines will largely depend on metallurgical establishments; whether these will employ mechanical, chemical, or smelting methods, or a combination of them, is as yet matter for conjecture. Most of the geological formations of this State extend into South Carolina, and whatever is said of the former may be said of similar parts of the latter State. In truth, the north and north-west portions of the latter State are quite as closely connected industrially with North Carolina as with the more southern parts of their own.

As regards iron mines, the resources of North Carolina are even greater, and are scattered quite as widely over the whole of the central and western parts of the State. The central belt, though abounding in places with the finest specimens of iron ore, has never been critically examined. The formations to the east and to the west (in the latter case quite near to the boundary line separating the two formations) abound in localities furnishing ore of the finest quality. The best known localities in the eastern belt are at Chapel Hill, Franklinville, Randolph county, Ashboro, and along Deep River. The ore at Chapel Hill is a red hematite, and is found about one mile north of the university. It is both abundant and pure. Chemical analysis and the practical tests of smelting both show it to be a high grade of iron. The Buckhorn Iron Mine, in the south-east corner of Chatham county, is a little to the east of the slate formation, being situated on the banks of the Cape Fear river. The deposit, which is mostly red hematite, containing in some parts a high percentage of manganese, is found capping a hill 200 ft. high. The ores are fairly pure, and of a good grade for smelting purposes, as is indicated by their application to the manufacture of car wheels. This and other mines near by are worked by the American Iron and Steel Company, which has erected furnaces and spent a considerable sum in improving the navigation of the Cape Fear river. More attention has been given to these mines than to any others in the State on account of their proximity to the Deep River coal fields near by, and the probability of a reliable and cheap fuel, such as no other mines in the State can boast of.

The copper industry of the State, though respectable, has been even less developed than the others described. Many of our gold mines have yielded copper ores in abundance, notably the Kerns, the Crosby, the Rogers, the Pioneer Mills, and the Gold Hill. The Yadkin, the McGinn, the S. Wilson, and the Rudisill, though not distinctively copper mines, have at times turned out considerable amounts of smelting ore. To these may be added the Gardner Hill and the Fisher Hill in Guildford county, the Chick Mine in Moore county, and the Phoenix in Cabarrus county. The Davidson or Emmons Mine, in Davidson county, has been very productive. The Clegg Mine, in Chatham county, has also been extensively worked. The most extensively worked copper mine in the State is at Ore Knob, Ashe county. The vein has been cut at points for 2000 ft., and varies in width from 5 to 20 ft. Immense bodies of ore are found, and give constant work to a very complete establishment, capable of turning out 2 tons per day of refined copper. At Elk Knob, Ashe county, is found a vein yielding copper pyrites, but as it has hardly been explored its value can only be conjectured. The Peach Bottom, or Maxwell Mine, in Alleghany county, was extensively worked prior to the war, and the concentrated material shipped to Baltimore for a market. The south western counties of the State have numerous localities showing copper veins, but so little work has been done that the value of these localities can only be conjectured. The Savannah, the Cullowhee, and the Waryhut are regarded as the most promising.

There are two coal areas in the State, both triassic—the Dan river, in the valley of the Dan river, near the north boundary of the State, and the deep river previously described. The area of the latter is estimated by Emmons at 300 square miles. The former is, probably, less, but it has been very little explored. The coal beds of the latter have been cut at two points about three miles apart—at Egypt and the Gulf, both in Chatham county. Prof. Emmons says that there are five seams, "separated by black slates, black band iron ore, and fire-clay." He also speaks of bituminous shales lying above the coal seams to the thickness of 70 ft., which are capable of yielding 30 per cent. of their weight in kerosene. The Dan river fields have hardly been penetrated, though explorations were carried on to some extent during the war, and some coal was mined. Very flattering analyses of the coal from both basins have been given, and are set forth in detail in the various geological reports of the State, and also in the special report of Admiral Wilkes to the Secretary of the Navy in 1858. Nevertheless, their real value for domestic purposes, and what is more important, for metallurgical fuels, is largely a matter of conjecture.

The difficulty of securing a convenient and cheap fuel will in the future constitute the chief drawback to a large development of our mineral resources, but our abundant forests will for the present afford us all needed supplies at little expense. Such are the more important mineral localities. The members of this board are fully aware that the list is imperfect, but the narrow limits of this paper forbade a longer one. If this short catalogue of North Carolina mines shall be instrumental in preparing the way to a thorough examination of its resources, and shall also further aid in leading to a wise development of them, the board will feel amply repaid for the effort expended in gathering the statistics.

MINING AND MINES IN COLORADO.

[FROM A CORRESPONDENT OF THE TIMES.]

BROWNVILLE, Aug. 11.

Though Colorado possesses an abundance of land well adapted for agriculture and grazing, yet its minerals, and the precious metals in particular, are the chief sources of its wealth. The value of its gold and silver product up to last January was $72,000,000, being a little more than 15 000,000*l.* sterling. Year after year the returns show an increase; in 1877 the yield was nearly $8,000,000, in 1873 it was under $4,000,000. The estimate for the current year is $2,000,000 in excess of the past one. Silver is produced so much more largely than gold that the value of the silver bullion is about $1,000,000 greater than that of the gold. As recent discoveries show the existence of vaster deposits of silver than any heretofore met with, Colorado is becoming every day noteworthy as the place where the less precious metal is as plentiful as it ever was in Potosi. Other minerals, such as lead and copper, are also extracted at a profit from the bowels of the Rocky Mountains, the yield of the former during 1877 being valued at $250,000, and of the latter at about $100,000.

Throughout the State of Colorado the subject of mining enters into nearly every conversation, and is constantly discussed in the newspapers. The farmer and the cattle breeder, the hotel-keeper and the banker, the merchant and the manufacturer, venture some of their money in mines, and think as much about the number of ounces per ton yielded by their property as of the state of the weather, the increase of their flocks and herds, the influx of travellers, the fluctuations of the money market, the conditions of business, and the demands of trade. Professional men are ready to invest their savings in mining speculations, and are satisfied to live in the hope of some day or other seeing them multiplied a hundredfold. Among the older settlers the majority have actually worked as miners. Indeed, had it not been for the discovery of gold here in 1852 by a few Cherokee Indians this State would not have attained its present position. For several years after the first influx of gold-seekers the quest after the more precious metal was unremittent. The belief prevailed that this region was a second and, possibly, a richer California. It is curious that the discoveries of gold and silver in the Rocky Mountains were actual realisations of a forecast made nearly a century before. In 1767 Mr. Jonathan Carver travelled through this part of the continent, and indited a record of what he saw. After describing the Rocky Mountains, which he styles the Shining Mountains, he expresses his belief that they surpass any in the world, adding, "Probably in future ages they may be found to contain more riches in their bowels than those of Indostan and Malabar, or than are produced on the golden coast of Guinea; nor will I except even the Peruvian mines."

The mining districts throughout this State are so many and so far apart that a long time would be required for a survey of them all. I have passed through several, and I heard, in turn, that each was the best. That from which I date this letter is as important as any, and posesses additional interest for me owing to English capital having been largely expended in it. Brownville is in Clear Creek County, and is 3 miles from Georgetown, where the Colorado Central Railway ends. It is in the centre of the silver district, and is commonly styled the Silver Queen City. The earliest discoveries of silver in Colorado were made in 1860 on the site of Georgetown. Two brothers named Griffith then pitched their tent on a solitary spot which is now covered with rows of good houses and contains 5000 inhabitants. They had missed their way, their design being to go to Middle Park to trade with the Ute Indians. George, the elder brother, went off to prospect for gold, while the younger went to shoot game. The former found a trace of the precious metal at a place now covered with a stable; the latter returned with the news that he had discovered the outcroppings of an iron mine. His more experienced brother pronounced the mine a gold one, and both of them extracted gold from the mineral. They made arrangements for erecting stamping machinery, and they were soon joined by other adventurers, who were attracted by the tidings that a new gold district had been discovered. Three years were occupied in efforts to extract gold from the lode, but these proved almost fruitless, or, rather, the returns of gold were far below the amount expended. Hence the occupants of the mining camp grew dispirited, and had a hard task to subsist by fishing and shooting. In 1864 a change for the better occured. Then it was found that the mine which the younger Griffith thought to be an iron and which the elder and wiser alleged to be a gold one, was in reality a silver mine of extraordinary richness. Moreover, the surrounding country was ascertained to abound in silver ore, and the mania for gold-seeking was succeeded by one for silver-hunting.

In the summer and autumn of 1865 as many as a thousand men of all professions and conditions were prospecting for silver. They learned, however, that it was more difficult to work a silver than a gold mine, and that the less precious metal could not be obtained by simply washing the mud or sand in a river's bed or on its bank. Smelting works for the reduction of the ore were requisite and these could not be erected and worked without considerable capital. However, capital being invested in the smelting works, crushing mills, and mines, Georgetown grew rapidly in size and importance. Hotels and schools and churches were built. The city now has the look of being prosperous, and its inhabitants fondly hope that its progress will be continuous. Though bearing all the semblance of a staid community, its citizens are still ready to execute wild justice upon those persons whom they hold to be criminals. A lady who arrived in Georgetown at the beginning of this year told me that on looking out of the hotel window one morning, she saw a man hanging from the bottom of a treatle-bridge. She learned on enquiry that he had been guilty of a crime deserving capital punishment—probably horse-stealing, which, as I explained in a former letter, is regarded in some Western States as more heinous than murder—and that the citizens had thought it expedient to administer the law with their own hands. But this is regarded as an exceptional case. No person conducting himself properly has more to fear in Georgetown than in New York, Boston, or Philadelphia. At Silver Plume, a small place between Brownville and Georgetown, the Irishmen who work in the mines sometimes get over excited, and discharge their pistols to relieve their feelings by emptying them; but here again the danger to life is not very serious. The number of persons who are killed or seriously wounded by pistol bullets throughout the United States bears an insignificant proportion to the number of shots fired. It seems to have been happily ordained that revolvers are not brought into play till their possessors have drunk so much whisky as to be partly

irresponsible for their actions, and wholly unfitted for taking aim. Nothing can be quieter or more exemplary than the conduct of the miners who congregate at Brownville.

The place is picturesquely situated; if it were in the Alps tourists would crowd to it and extol its beauties. Nearly 10,000 ft. above the level of the sea, it is yet overshadowed by pine-clad mountains on either side, and during six months out of the twelve these mountains entirely intercept the sun's rays. But the view up and down the valley is extensive and striking, though mountains close the prospect far away in the distance both ways. Yet there is ample space both to move about and to gratify the eye. On the right hand, going up stream, the mountain slopes conceal vast mineral wealth, while the opposite side yields scarcely any return to the miner.

The most extensive and noteworthy among the mines here is the COLORADO UNITED, belonging to an English company. It is the one which visitors prefer to inspect, as it is both on a larger scale and fraught with more points of interest to a sightseer than the other mines. If I were to follow the example of some United States tourists who have journeyed to the mine, I should begin by enlarging on the dangers of the road between Georgetown and Brownville, but as I saw nothing to alarm any person who was not exceptionally nervous or imaginative, I refrain from so doing. The mine itself is so admirably laid out that it can be traversed with comparative ease and almost without risk. A shareholder in this mining company accompanied me, and we were guided throughout the workings by Mr. Morgan, the efficient and popular superintendent. I was told that several persons from England have inspected this property in order to satisfy themselves by ocular evidence that it contained ore, and might some day yield dividends. The shareholders have already received some return for their investment, but nothing has been paid for the last three years. Unless I greatly err, the Colorado United Mine differs from certain other mines which have enriched United States vendors and impoverished English shareholders. I would class all mines in one of three categories.

In the first I would place all the ordinary mines that are mere holes in the ground into which money goes and out of which nothing more valuable than water ever comes. These mines are fitted to sell and not to pay. In the second category I would place the progressive mines, which are always on the verge of paying the expenses of working them, and which feed the sanguine shareholder with visions of prospective dividends. If the ore would but become richer, or if the price for it would increase, then success would be certain. But the common result is that such a mine is a monster continually calling for more capital, and only returning at the best 19s. for every 20s. expended. The mines I would place in the third category deserve to be called extraordinary, because they can be carried on without loss, and may even yield a profit. Following this classification, I am justified in styling the Colorado United Mine an extraordinary one. Though 200 men are employed in it, and the monthly cost has been nearly 3000*l.*, and though the company have no working capital, yet the ore taken out is rich and plentiful enough to meet the outlay, with the prospect of ultimately leaving a margin for distribution among the shareholders. Unlike many other projects of the kind, this one has suffered on account of its value. Had it been worthless the English shareholders might have remained in undisturbed possession of it; but, as its value was supposed to be great, an attempt was recently made to oust them. Finding it hopeless to contend with a shrewd opponent, who had the judge on his side, the company effected a compromise, and have now a fair chance of reaping the reward due to them. To describe the mine itself, or rather the series of mines, for the company possess 19, without entering into technical details is scarcely possible. The sightseer walks through a narrow tunnel for a distance of 600 ft., enters drifts branching from the tunnel, descends a shaft by ladders to a lower level, enters other drifts, is stunned and deafened by explosions of gunpowder when a charge is fired in some of the workings, and is left in darkness owing to the candles being extinguished by the concussion of the air. He sees, while the candles burn, masses of ore glittering brightly and worth much money, and he returns to daylight with the conviction that the mine is very rich, and mining very unpleasant. The mill in which the ore is concentrated is more easily appreciated by an inexperienced spectator. He is shown the mass of mineral, resembling the surface deposits on a dusty road in a chalk country, passed through the crusher, reduced to powder, then passed along boards, where a current of water washes away the impurities, the product being concentrated mineral having a monetary value, and yielding a profit of about $14 a ton. What may seem most noteworty is the process peculiar to this mill among the mills of Clear Creek county whereby the finer particles of silver are extracted from the sand. It is obvious that when there is an abundance of ore, and when the ore is rich enough to yield a profit, mining becomes a matter of simple mechanical detail and arithmetical calculation.

Unless the case be exceptional, the man who attempts to make money by mining without having any capital to draw upon is wasting his time and strength. In the early days of the gold excitement in the United States and Australia it was possible for a man to wash as much gold dust or to pick as many nuggets out of a river's bed as would remunerate him. At present a working miner may gain a livelihood or earn a fortune by digging in the ground at Leadville, where silver ore of great value is to be found a short way beneath the surface. But the rule is for mining to become as much a business as shipbuilding or cotton-spinning, and to require as much capital invested in mechanical appliances. Wherever I go here I meet with the possessors of mines which they cannot work for lack of means. Many of these ventures would pay well if judiciously dealt with. They might pay a dividend on a small capital. What commonly occurs is for speculators to buy them at a low price and then to resell them to promoters in England. They cannot find persons in New York or Boston to give a price for them, as the capitalists in those cities have already suffered too often and lost too much by putting their money in Western "wild cat" mines. I was told a story the other day by by a gentleman from the Eastern States illustrative of this. Some of his friends had secured what they believed to be a valuable mine in Colorado. It paid well for a time. Then the superintendent forwarded adverse reports and called for more capital. The money was supplied, but the mine instead of improving became steadily worse. As a matter of course, the shares fell to a nominal price.

The superintendent, notwithstanding the gloominess of the prospects, showed his confidence in the future and his good faith at the time by buying the shares of which the holders were tired. They were glad to dispose of them to him at a very low rate. A casual investigation of the books showed that the superintendent was on the point of becoming possessor of more than half the shares, and as a consequence the master of the company. Suspicions being aroused, further investigation showed that the mine was a valuable one, and that the reports to the contrary were utterly false. The process is known in the West as that of "freezing out" the shareholders. The man who practises it successfully is styled "smart." A man who rates a mine too highly or deals treacherously as vendor will also be deemed "smart," provided he makes money. Some gentlemen connected with the Emma Mine were emphatically "smart men." A Colorado banker, speaking to me about a "prominent citizen" and praising him, added the qualifying remark, "It is strange that a man like him, who is just in his dealings generally, should do some extraordinary things as regards mines and yet think that he is not open to reproach." I anticipate that the English public may again be tempted to invest in United States mines. The temptation to do so will be the greater should the Colorado United Mining Company demonstrate by dividends its title to be ranked among extraordinary mining enterprises. But the public will not repent of displaying much caution, not to say scepticism. It is true there are many chances for investing money to advantage in Colorado mines. The two considerations of moment are—. Is the property intrinsically valuable?—2. Is it so valuable as to be worth the price asked for it in London? The price may be four times greater than that paid in Colorado, and the difference may suffice to prevent the mine yielding returns large enough to pay a dividend on so large a capital. The question of management is the next point of importance, and is the one about which blunders are constantly made. It is even more difficult to secure a competent and trustworthy manager than to purchase a good mine. The English capitalists may rest assured that there is an ample field in the State of Colorado for making money by mining—and for losing it.

FOREIGN MINING AND METALLURGY.

Contracts were let on Thursday for 169,200 tons of coal required for the Belgian State Railways. It is expected that the price at which these contracts were let will indicate a general maintenance of rates, but nothing more. The Hazard Collieries Company has just brought into activity its new Micheroux pit. The equipment of this pit has been carried out with much care, and at a heavy cost. The pit has been supplied with a powerful horizontal extraction engine from the works of Messrs. Beer Brothers, of Jemeppe. The Hazard Company is commencing a third pit; this fact may excite surprise in the midst of a crisis like that through which the Belgian coal trade is now passing; but, with the exception of 1867 and 1869, the production of the company has increased year by year since 1853. We cannot say as much of the sale prices obtained by the company; on the contrary, they have been subject to very rough and trying variations.

It is rumoured that contracts will shortly be invited for 50 locomotives for the Belgian State Railways. This would be a great boon to the mechanical establishments of Belgium, which are producing in advance in order to employ their workpeople. Should contracts be let for the 50 locomotives spoken of they would replace the order recently given out for 21 engines, in regard to which nothing appears to have been done at present. Business seems to have sustained a check in the Belgian iron trade; few contracts have been concluded of late, but the Ougrée Ironworks have obtained an order for 4000 tyres for the Eastern of France Railway company.

In the French department of the Nord there would be very little passing in coal just at present but for the fact that the sugar works are giving out some rather important orders. Beetroot sugar manufacturers appear to consider that the season has commenced under favourable auspices, and they have not hesitated accordingly to lay in supplies of coal. They have been the more encouraged to do this as coal has remained at a temptingly low price. There is nothing very special to report as regards the coal basin of the Loire; there is not much business doing, but coalowners are anticipating an improvement in affairs. The Municipal Council of Lens has voted a subvention of 4000*l.* in aid of a proposed improved line of navigation from the North of France to Paris. This improvement has been cordially supported by the Councils-Generals of the Pas-de-Calais, the Somme, the Oise, and the Nord. According to a report prepared by M. Castel, mining engineer, coal mining industry did not revive in the department of the Loire in 1877. Thus the production of the basin stood last year at 3 292 300 tons, showing a reduction of 255,700 tons, or 7¼ per cent. The selling price declined in 1877 to the average extent of 10d. per ton. Out of 64 coal mining concessions in the St. Etienne basin 17 remained unworked in 1877.

In the iron trade of the French department of the Haute-Marne the current of affairs is still comparatively limited. Mixed iron is in some demand at 7*l.* 12s. to 7*l.* 16s. per ton; machine iron maintains a nominal quotation of 7*l.* 12s. per ton. In the Muerthe-et-Moselle group the tone of business has been rather unfavourable. A fall of about 2 per cent. has taken place at Longwy in refining pig. Iron has been fairly sustained in the Meurthe-et-Moselle at 6*l.* 14s. to 6*l.* 16s. per ton.

VENEZUELAN GOLD.

The following authentic information respecting the deposits of gold on the southern portion of the Buena Vista estate will be read with much interest. For ages past it has been known to contain very valuable gold-bearing strata; and long before the Spaniards commenced operations the native Indians were constantly bringing into the towns and villages nuggets of gold and bartering them for food, &c. The reports of the great riches which laid unwrought in the interior naturally aroused the cupidity of the Spaniards, who organised expeditions to explore the country, but met with almost insurmountable difficulties, as not only had they to cut through the forest, but having excited the jealousy of the natives, who, whilst pretending to act as guides, would systematically endeavour to mislead the explorers, and place every obstacle in the way to prevent the discovery of the gold districts. However, by following the rivers and searching the ravines, at length very promising indications were discovered in the Tesorero, Santa Cruz, and Guaratarro rivers, where quantities of gold in large nuggets were found, and the remains of old Spanish washing works can be seen to the present day.

It must be understood that, in conducting explorations in this country, the vegetation is so dense that the only way to discover gold or mineral of any kind is to trace the indications and outcroppings which present themselves on the rugged banks of the rivers and mountain streams, and in the various ravines which have been occasioned by volcanic and other causes. Throughout the writer's explorations in Venezuela he invariably found the first evidence of the existence of mineral by adopting this course; and where indications or mineral outcroppings were met with, would then set a party of three or four men to follow the course from the point of discovery. The difficulties which in former times rendered any excursion into the interior not only a tedious but somewhat dangerous undertaking, have now to a very great extent been removed by the construction of the Bolivar Railway, the stations and depôts of which render the explorers safe and healthy head-quarters, from which they can conduct a much wider field of exploration over all parts of the surrounding estates, and consequently the old Indian and Spanish workings, which have so long remained dormant, are now comparatively readily accessible.

The following information is gathered from reports by Baron Von Humboldt, the late Captain Prince, and other sources:—Baron Von Humboldt writes thus with reference to this property in his second volume of Travels in the Equatorial Regions of America, page 65 —"Among the rivers which descend north-east towards the coast of Puerto Cabello and La Punta de Hicacos the most remarkable are those of Tocuyo, Aroa, and Yaracuy. In the ravines nearer the sea the Indians have their gold washings, and the soil conceals rich copper ores which no one has yet attempted to extract. The ancient mines of Aroa (now being worked by the New Quebrada Company) after having been long neglected have been wrought anew by the care of Don Antonio Henriquez. The copper, known at Cadiz by the name of Caracas copper, is of excellent quality; it is even preferred to that of Sweden, and of Coquimbo, in Chili. Some ores of silver have been recently discovered between Aroa and Nirgua, near Guanita, in the mountain of San Pablo. Grains of gold ore are found in all the mountainous lands between the River Yaracuy, the town of San Felipe, Nirgua, and Barquismeto, particularly in the Rio de Santa Cruz, in which the Indian gold gatherers have sometimes found lumps of the value of four or five piastres. The gold deposit of Tesorero is about 1½ league from Guaratarro. The Spaniards had several washings here, and the Creoles say quantities of gold in large nuggets were discovered, but like everything else it has been left to itself since the expulsion of the only people who benefited the country generally. The Creole so long as he has a plantain and a plate of beans will never trouble himself about gold, copper, or any other deposit."

Capt. Prince writes—After spending a fortnight in the Tesorero and Guaratarro districts, inspecting the rivers, quebradas, and ravines in the vicinity in Tesorero, which is situated about three miles north-north-east and east of the Guaratarro, we discovered in all the quebradas and ravines particles of gold, and this with only a slight surface washing in Tolumas and common dinner plates, particularly in the dry bed of a flood torrent called the Quebrada de Tucana, situated one mile south-south-east of the hamlet of Tesorero; in short, for many miles vast ferrugenous alluvial deposits, auriferous in all parts, which when developed will prove another California. The silver mine of Guaratarro lies to the south-east of La Hacha about three leagues. It was discovered by a Spanish priest, who opened on it slightly, and while seeking a working grant from his Government died of fever. The mine is well known to exist by just all the Creoles in the vicinity of La Luz and La Hacha, but from a foolish superstition which they entertain, to the effect that the ground is either haunted or was poisoned by the Spanish to prevent their conquerors from being benefited, it is difficult to procure a guide, and without one to go even 100 yards from the mule track in such close wooded lands, is dangerous.

In addition to the foregoing particulars the confirmatory information gained from residents in the neighbourhood of La Luz, La Hacha, and other places adjacent to the gold fields, leaves no doubt but that a thorough investigation and geological inspection of the localities mentioned would be certain to produce highly successful and profitable results at a moderately small outlay.

Registration of New Companies.

The following joint-stock companies have been duly registered:—

THE BORAX COMPANY (Limited).—Capital, 50,000*l.*, in shares of 10*l.* To acquire land and deposits of borax in the district known as the State Range, California, belonging to the State Range Borax Company (Limited); also to acquire the business of the London Borax Company, together with that of the Borax Company (Limited) of Birmingham. The subscribers (who take one share each) are—Joseph Cooper, 25, Canonbury-square, gentleman; John Puddy, 37, Mincing-lane, broker; G. Gregor, jun., Plasket, East Ham, no occupation; John Burbidge, 62, Moorgate-street, advertising agent; W. F. Dennis, 93, Leadenhall-street; L. A. da Costa, Mitcham, gentleman; J. Richardson, Cobham, no occupation.

GUADALAJARA GOLD AND SILVER COMPANY OF SPAIN (Limited).—Capital 100,000*l.*, in 10*l.* shares. To carry on mining operations in the province of Guadalajara, Spain. The subscribers are—J. Morrell, 345, Oxford street, auctioneer, 10; W. Somerly, 14, Ryder-terrace, Twickenham, 1; J. Hackworth, Union-court, Old Broad-street, engineer, 10; J. Brown, 50, York-terrace, Regent's Park, surveyor, 1; F. W. Wafell, 84, Hungerford-road, Camden-road, auctioneer, 1; J. Wentworth F. Chapman, King William street, 1; P. W. Brenan, C.E., 19, Bishopsgate-street Within, 10. The directors are Messrs. Morrell, Hackworth, and Brenan.

PALESTINE RAILWAY, LAND, AND BUILDING COMPANY (Limited).—Capital 4,000,000*l.*, in 10*l.* shares. To carry out railway and building enterprise in Asia Minor. The subscribers (who take one share each) are—T. J. Armstrong, 3, Adelaide-place, E.C.; G. L. Blake, Herbert-street, Hoxton; J. H. Ginder, 46, Gresham-street; H. B. Passmore, 28, Martins-lane; G. S. Rashleigh, 657, Old Kent-road; J. R. Rowland, 46, Gresham-street; W. H. Williams, 187, Commercial-road, E.

GROS UNIVERSAL SOLE SEWING MACHINE COMPANY (Limited).—Capital 50,000*l.*, in 5*l.* shares. To acquire patents in connection with sewing machinery for boots and shoes. The subscribers are—Arthur Ballon, 10, Old Jewry Chambers, 50; H. C. Gros, Hackney; Walter Lumley, 15, Old Jewry, 30; Alfred J. Barrow, 145, Bermondsey-street; H. C. Rooke, 13, New North-road, 50; P. Wilson, Old Jewry Chambers, 1; J. L. Fryer, 28, Chiswell-street, 1.

BELGIAN BRICKMAKING COMPANY (Limited).—Capital 25,100*l.*, in shares of 10*l.* and 1*l.* To acquire land, together with an existing brickmaking business, at Duffee, near Antwerp. The subscribers (who take one share each) are—E. Schubert, 32, St. Swithin's-lane; John Palmer, 29, St. George's-road; J. Davey, 70, Cornhill; W. Wood, 70, Cornhill; John Pearson, 119, Albion-road, Stoke Newington; J. N. R. Worrall, 137, Fenchurch-street; R. Jordan, Fairfield-road, Bow.

PURE ICE MANUFACTURING COMPANY (Limited).—Capital 100,000*l.*, in 10*l.* shares. To develope ice works now in operation at Chelsea, and to carry on business as ice manufacturers. The subscribers (who take one share each) are—H. T. Philippin, 6, Lombard-street; J. Pelissier, 6, Lombard-street; W. Field, 26, Leadenhall-street; J. Engster, 2, Gresham Buildings; J. T. Temple Powell, 6, Lombard-street; B. D. Jackson, 30, Stockwell-road; D. Guillod, 17, Trafalgar-square.

PATENT MACHINERY WAREHOUSING AND EXCHANGE COMPANY (Limited).—Capital 25,000*l.*, in 10*l.* shares. To carry on business as machinery brokers, &c. The subscribers (who take one share each) are—A. L. Coles, 2, Newport Villas, Finchley; C. W. Coles, Alderminster-road, Bermonsey; R. Harding, Durham-road, Kingsland; E. Meritt, Manor Park, Essex; A. Mowatt, 4, Green-lane terrace, N.; J. Court, 39, Sutton-street, Lambeth; W. C. Day, Brunswick-place, City-road.

CONSOLIDATED CREDIT AND MORTGAGE COMPANY (Limited).—Capital 1000*l.*, in 1*l.* shares. To advance money, &c.

STEEL HEART TOOL COMPANY (Limited).—Capital 3000*l.*, in 5*l.* shares. To acquire a patent for improvements in the manufacture of pointed edge and other tools for agricultural and mining purposes. The subscribers (who take one share each) are—E Rouse, Bideford; N. Whittington, Holcombe; M. Hayes, Newport, Monmouth; D. J. Nurse, Newport; T. Morgan, 15, Brunswick-street, Bristol; G. G. Dineley, 8, New-square; E. N. Thompson, 18, King's-road, Bedford-row.

ST. IVES, HANTS, GAS COMPANY (Limited).—Capital 10,000*l.*, in 10*l.* shares. To supply gas to St. Ives.

GAS MOTOR.

An improved gas motor, in which the power generated by the explosion of a mixture of gas or vapour and air is transmitted to an elastic piston, which gives it off by a connecting rod to a crank shaft with fly wheel, has been invented by Mr. Rudolf Schaeffer, of Blasewitz, near Dresden. The machine has two cylinders of comparatively short length and large diameter, which are screwed with their bottom ends opposite to each other to a central part of the framing. The cylinders are open at the top end; the pistons are fixed to a triangular frame, swinging on pivots, which have their bearings at some distance above the said central part of framing, and the pistons as well as the cylinders are so arranged with regard to the said pivots that the pistons work freely in the cylinders while they move to and fro with the swinging frame. The pistons consist of a hollow drum having a fixed top and movable bottom, between which springs are inserted. The forward piston is suitably strengthened and jointed to the connecting rod.

The mixture of gas or vapour and air is aspired by a special pump, and pressed into the corresponding cylinder after the piston of the same has moved forward a certain distance at the beginning of the outward stroke; there is a pump for this supply of gas and air in combination with each cylinder. The piston of either of the pumps is connected to a lever actuated by an eccentric on the main shaft, the fulcrum of the lever being made adjustable for the purpose of providing means for regulating the quantity of gas and air aspired at every stroke. The ignition of the explosive mixture is effected at the proper moments by means of a gas flame burning in front of a narrow slit in the cylinder bottom, and of a current of air which a small pump forces through a sort of blow pipe into the flame, thereby driving it through the said slit into the cylinder. The ignition may however, be effected by means of electricity or in any other known manner.

When the explosion takes place the bottom of the piston is first of all propelled forward against its springs, whereby power is stored up, and concussion avoided. The gases resulting from the explosion thereupon act on the body of the piston, which leaves the cylinder altogether at about half-stroke, and allows the combustion gases to escape. Suitable valves, arranged in the pipes connecting the pumps for gas and air with the cylinders, prevent the explosion from acting backward on the pumps.

LEAD.—Exports of lead for seven months ending July 31:—1876, 20 061 tons; value, 457,724*l.*; average per ton, 22*l.* 16s; 1877, 23,235 tons; value, 512,625*l.*; average per ton, 22*l.* 1s.; 1878, 21,944 tons; value, 422.914*l.*; average per ton, 19*l.* 5s.

AWARDED THE PRIZE MEDALS AT LEEDS, MANCHESTER, AND WREXHAM EXHIBITIONS, 1875 AND 1876.

HADFIELD'S STEEL FOUNDRY COMPANY

ATTERCLIFFE, SHEFFIELD,

DEVOTE THEIR EXCLUSIVE ATTENTION TO THE MANUFACTURE OF

CRUCIBLE STEEL CASTINGS, for Engineering and Mining Purposes,

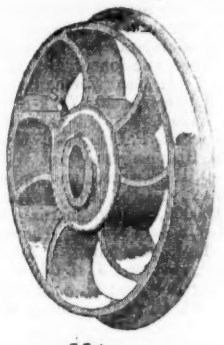
AND ARE THE SOLE MAKERS OF

Hadfield's Self-oiling Steel Wheels

(PATENTED).

These possess advantages held by no other wheels, and are specially adapted for Collieries, Ironstone Mines, Slate Quarries, Lead and Copper Mines, &c., &c., where LOOSE Wheels are used (*i. e.* those revolving upon their own axles). By the old system of lubricating loose wheels, it is well known thisis attended with constant labour and excessive waste; and as so little of the grease or oil applied reaches the wearing surfaces, and as re-greasing can only take place at fixed parts of the workings, the bosses of the wheels and bearings of the axles soon become dry, and cut each other: thus causing enormous wear and tear, and necessitating extra labour, haulage power, and expense. These and numerous other defects are entirely remedied by these wheels, as will be readily seen from the following illustrations and advantages claimed.

N.B.—Price per Set of Wheels and Axles (ready for use) forwarded on receipt of—1. Diameter of Wheel on tread. 2. Width of tread. 3. Diameter and total length of axle, also whether No. 74 or 75. 4. Rail gauge. 5. Rolling load.



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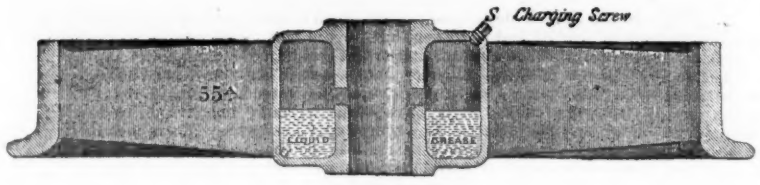

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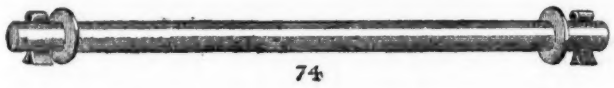

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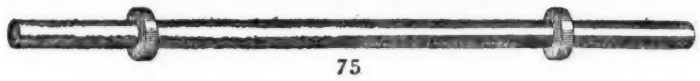

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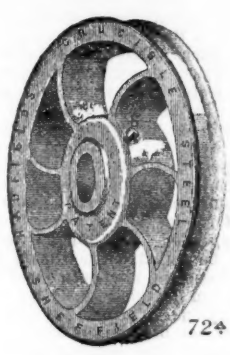

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This Advertisement is varied from time to time.

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The following are a few of the numerous Advantages claimed by the above Self-oiling Wheels:—

1.—Two-thirds (at least) less grease or oil is required than at present used by any known method of lubricating Mining Wagons, whether by hand, machine, or otherwise.
2.—These wheels effect a very great saving in haulage power; also wear and tear—being so constructed as never to allow the bearings to become dry. The revolving of the wheel leads out the oil as required, and immediately the wagon stops the lubricator ceases its action,
3.—No waste of grease can occur, no matter in what position the wagon may be placed, when discharging its contents (even if up side down); and when the wagons are not in use it is utterly impossible for any grease to escape, as it is all stored below the outlet (as shown above).
4.—When once these wheels have been charged with liquid grease (which can be done by any inexperienced person) they do not require any attention or re-greasing whatever for several weeks or even months afterwards, in proportion to the distance travelled.
5.—These wheels can be readily fixed to any description of either wood or iron corves now in use, whether the wheels are upon the inside or outside of the frame.
6.—They are exceedingly simple in construction, have no detail, and are not liable to get out of order.
7.—They possess great strength, durability, and extreme lightness, being made of CRUCIBLE STEEL.

Where FAST Wheels and Axles are adopted instead of Loose ones, *as shown above,* **see our Illustrated Sheets of Drawings Nos. 2 and 3 of**

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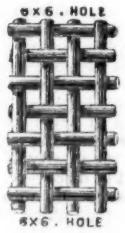
LEAD AND COPPER MINES.

Jigger Bottoms and Cylinder Covers woven ANY WIDTH, in Iron, Steel, Brass, or Copper

EXTRA STRONG PERFORATED ZINC AND COPPER RIDDLES AND SIEVES.



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EVERY COIL of FUSE MANUFACTURED by them has TWO SEPARATE THREADS PASSING THROUGH the COLUMN of GUNPOWDER, and BICKFORD, SMITH, AND CO. CLAIM SUCH TWO SEPARATE THREADS as THEIR TRADE MARK.

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CORNISH PUMPING, WINDING, AND STAMPING ENGINES; STEAM CAPSTANS AND CRUSHERS; WATER-WHEELS; PUMP-WORK; SHOVELS, AND HAMMERED IRON FORGINGS OF EVERY DESCRIPTION.

Also of SPUR, MORTICE, MITRE, BEVIL, and other WHEELS, of any diameter up to 12 feet, made by Scott's Patent Moulding Machine, without the aid of patterns, and with an accuracy unattainable by any other means.

MACHINERY or FOREIGN MINES carefully prepared.

SECONDHAND MINING MACHINERY, in good conditon, always on sale, at moderate prices.

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MANUFACTURE RAILWAY CARRIAGES and WAGONS of EVERY DESCRIPTION, for HIRE and SALE, by immediate or deferred payments. They have also wagons for hire capable of carrying 6, 8, and 10 tons, part of which are edustructed specially for shipping purposes. Wagons in working order maintained by contract. MANUFACTURERS also of IRONWORK, WHEELS, and AXLES. EDMUND FOWLER, Managing Director.

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LEAD MINING IN NORTH WALES.—The concession of an EXTENSIVE RANGE of LODES, traversing the Millstone Grit, and two recognised "flats" in the Mountain Limestone, has been secured by the undersigned, and upon favourable terms. Two or three parties WILL BE TREATED WITH for the PURCHASE of TWO-FIFTHS for £1000. The money to be expended in prospectusing and realising two points of great prospective value.

None but principals will be treated with, and mining experts preferred, as the merits and prospects will bear investigation and criticism.

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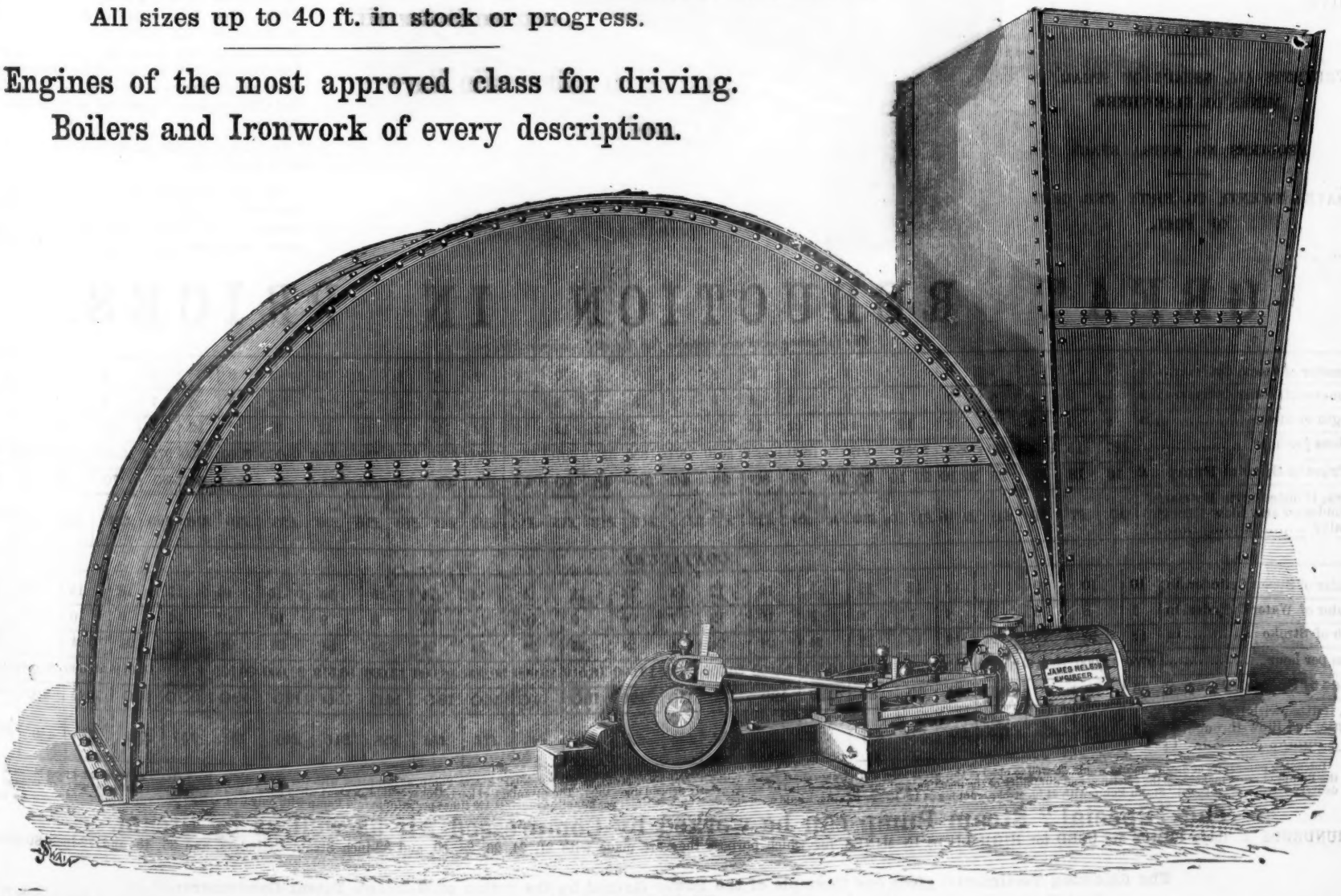

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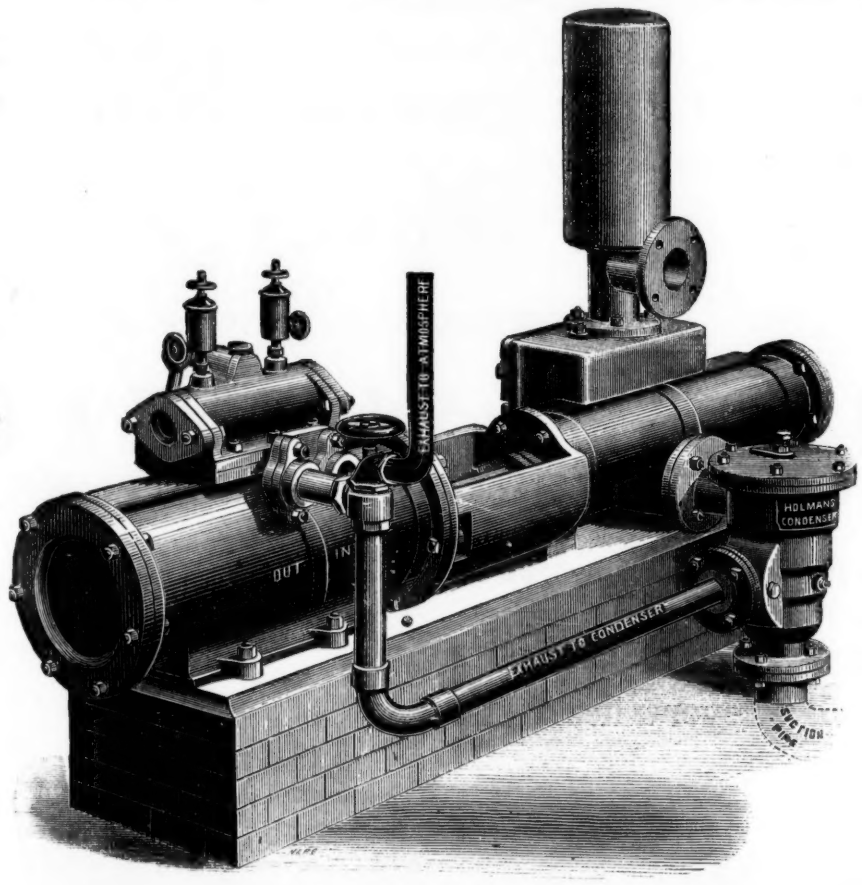

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Length of Stroke .....In.	9	9	9	9	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	18	12	12	12	18	24	12	12
Gallons per hour	680	815	1830	3250	1830	3250	5070	1830	3250	5070	7330	1830	3250	5070	7330	9750	3250	5070	7330	9750	13,000	5070	7330	9750	13,000	16,500	5070	7330
Price of Special Pump ...£	**16**	**18**	**20**	**25**	**22 10**	**27 10**	**32 10**	**25**	**30**	**35**	**40**	**30**	**35**	**40**	**45**	**50**	**40**	**45**	**50**	**55**	**65**	**50**	**55**	**60**	**70**	**85**	**55**	**60**
Extra, if fitted with Holman's Condenser and Blow-through Valve	£7	£7	£9	£11	£8 10	£11 10s	£12 10s	£9	£12	£15	£15	£10	£13	£15	£16	£22	£13	£16	£16	£22	£22	£16	£16	£23	£24	£35	£17	£17

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Diameter of Steam Cylinder..In.	10	10	10	10	12	12	12	12	12	12	14	14	14	14	14	14	16	16	16	16	16	18	18	18	18	18	18	18
Diameter of Water Cylinder..In	7	8	9	10	6	7	8	9	10	12	7	8	9	10	12	14	8	9	10	12	14	9	10	12	14	16	12	14
Length of Stroke .....In	12	18	24	24	18	18	18	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Gallons per hour	9750	13,000	16,519	20,000	7330	9750	13,000	16,519	20,000	30,000	9750	13,000	16,519	20,000	30,000	40,000	13,000	16,519	20,000	30,000	40,000	16,519	20,000	30,000	40,000	50,000	30,000	40,000
Price of Special Pump..£	**65**	**75**	**90**	**100**	**75**	**80**	**85**	**110**	**120**	**140**	**110**	**120**	**130**	**140**	**160**	**180**	**140**	**150**	**160**	**180**	**200**	**180**	**190**	**210**	**230**	**250**	**210**	**230**
Extra, if fitted with Holman's Condenser and Blow-through Valve	£23	£24	£35	£35	£20	£27	£27	£38	£38	£50	£28	£28	£40	£40	£55	£55	£28	£40	£40	£55	£55	£45	£45	£56	£60	£70	£56	£60

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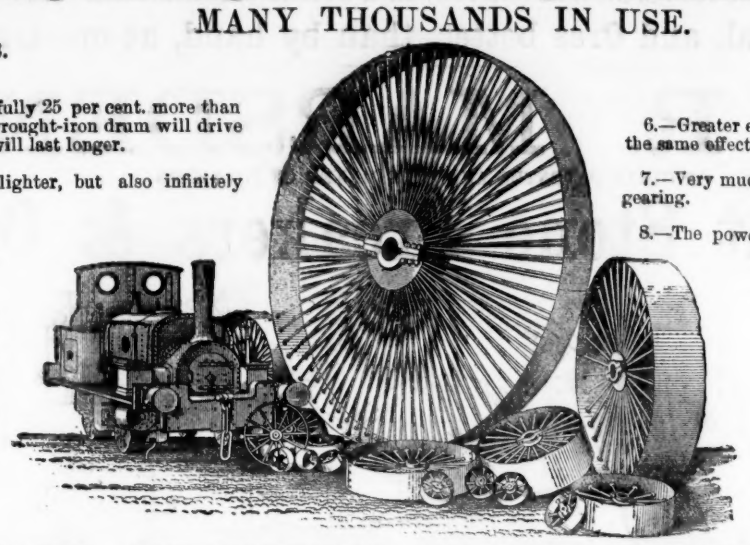

ADVANTAGES.

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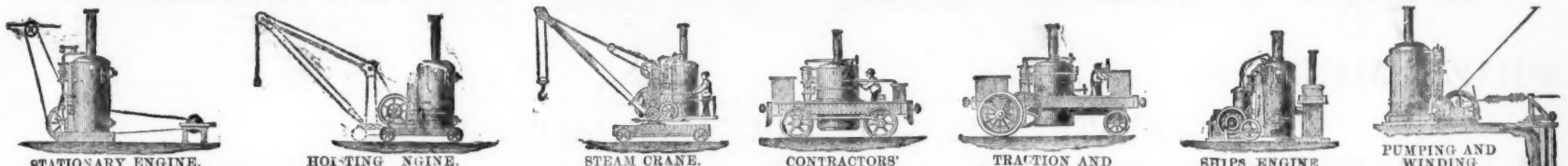

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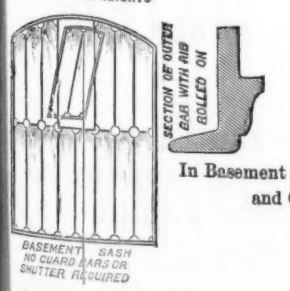

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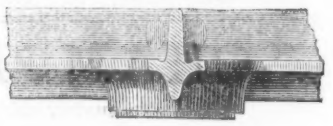

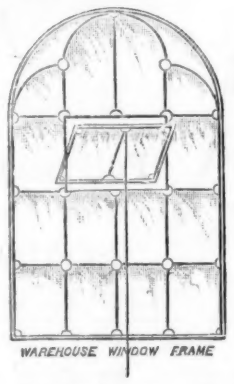

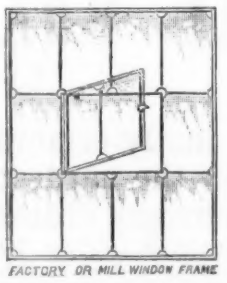

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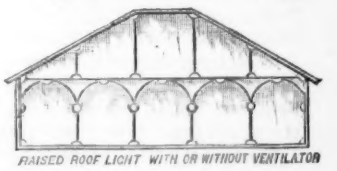

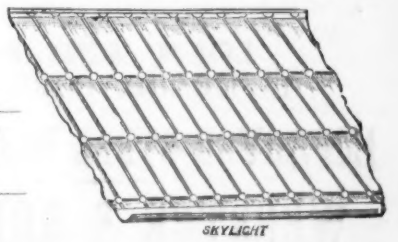

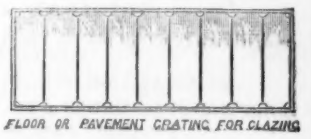

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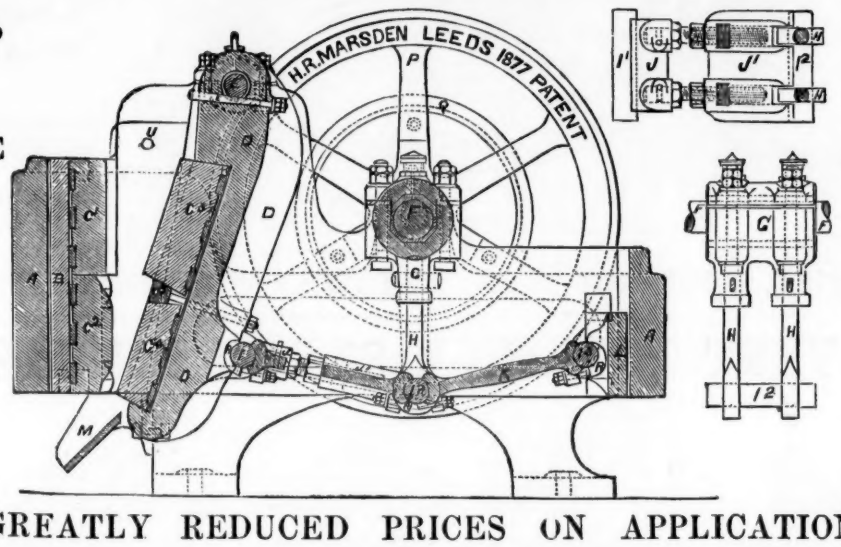

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H. E. MARSDEN, Esq., Soho Foundry, Meadow-lane, Leeds.

DEAR SIR,—The machine I have in use is one of the large size, 24 in. by 12 in. The quantity we are breaking daily with this one machine is 250 tons, the jaw being set to break to a size of 2¼ in. We have, however, frequently broken over 300 tons per day of ten hours, and on several occasions over 360 tons during the same period. The stone we break is the blue mountain limestone, and is used as a flux in the various ironworks in this district. We have now had this machine in daily use for over two years without repairs of any kind, and have never had occasion to complain of any inconvenience in using the machine. I hope the one you are now making for me may do its work equally well. The cost—INCLUDING ENGINE-POWER, COALS, ENGINEMAN, FEEDING, and all EXPENSES OF EVERY KIND—is just 3d. per ton. Should any of your friends feel desirous of seeing one of your machines at work, I shall have much pleasure in showing the one alluded to.

I am, dear Sir, yours very truly,
WILLIAM MILLER.

AND THIS—

Wharthole Lime Works, Aspatria, Cumberland, July 11th, 1878.

H. R. MARSDEN, Esq., Soho Foundry, Leeds.

DEAR SIR,—We are in receipt of your letter of 4th inst. I may just state that the stone breaker above named has been under my personal superintendence since its erection, and I have no hesitation in saying that it is as good now as it was five years ago.

I am, dear Sir, yours faithfully,
FRANCIS GOULD.

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